ANNUAL OPERATIONS, MAINTENANCE, AND MONITORING STATUS AND EVALUATION REPORT (OM&M&E REPORT)

OCTOBER 2006 THROUGH SEPTEMBER 2007

WASTE DISPOSAL, INC. SUPERFUND SITE
SANTA FE SPRINGS, CALIFORNIA

Prepared for

United States Environmental Protection Agency

Prepared by

Project Navigator, Ltd.
TRC
Terradex, Inc.

Irvine, California

On Behalf of

Waste Disposal, Inc. Group (WDIG)

June 2008

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Project No. 125154.0000.0000

June 2008

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June 20, 2008

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Mr. Russell Mechem
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75 Hawthorne Street
San Francisco, CA 94105-3901

Transmittal
Annual Operations, Maintenance, and Monitoring
Status and Evaluation Report
Waste Disposal, Inc. Superfund Site
Santa Fe Springs, California

Dear Russell:

Enclosed please find two copies of the Annual Operations, Maintenance, and Monitoring (OM&M) Status and Evaluation Report for the Waste Disposal, Inc. (WDI) Superfund Site in Santa Fe Springs, California. This document satisfies the requirements for reporting of the Final Operations, Maintenance, and Monitoring Plan (OMMP), date August 2006.

Section 8.8 provides recommendations for the continued OM&M activities at WDI including the following:

- The Reservoir Gas Collection System is operating in passive mode since December 2007. It is recommended that it continue in the passive mode which includes semi-annual monitoring pursuant to the OMMP. Operation of the system in passive mode will provide an opportunity to evaluate changes to soil gas quality as a result of decreased air infiltration.

- Constituents detected above the Indoor Air Threshhold Levels (IATLs) are believed to be associated with tenant activities. It is recommended that In-Business and Ambient Air monitoring and sampling frequency be reduced to semi-annual in accordance with the Decision Criteria, Figure 4-1.

- Subsurface biodegradation changes appear to be occurring due to the past operation of the Reservoir Gas Collection System and Biovent Wells that have

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introduced air below ground. The monitoring results indicate the subsurface has become more aerobic and may be supporting some vapor phase contaminant migration. It is recommended that the Biovent Wells be closed or reversed. A plan to support this change will be provided in the future, if required.

If you have any questions or comments, please call me at (949) 374-0913.

Very Truly Yours,

Kenneth J. Floom, PE
WDIG Project Coordinator

Enclosure

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LIST OF ACRONYMS AND ABBREVIATIONS

AAO	Amended Administrative Order
AO	Administrative Order
ARARs	Applicable of Relevant and Appropriate Requirements
AROD	Amended Record of Decision
BMPs	Best Management Practices
BTEX	benzene, toluene, ethylbenzene and xylenes
EPA	Environmental Protection Agency
°C	Celsius
CCR	California Code of Regulations
CD	Consent Decree
CERCLA	Comprehensive Environmental Response, Compensation and Liability
CIWMBs	California Integrated Waste Management Board's
COCs	Chemical of Concerns
CRQL	Contract Required Quantitation Limit
CTP	Compliance Testing Plan
CTR	Compliance Testing Report
DNAPL	Dense Nonaqueous Phase Liquids
DTSC	California Department of Toxic Substances Control
DTW	Depth to Water
EPA	Environmental Protection Agency
ERC	Environmental Restriction Covenant
fbg	feet below grade
FID	Flame Ionization Detector
FY	Fiscal Year
HASP	Final Health and Safety Plan
IATLs	Indoor Air Threshold Levels
ICs	Institutional Controls
ICMEWP	Institutional Controls Monitoring and Enforcement Work Plan
LC	Leachate Collection
ITLs	Interim Threshold Levels
LTM&E	Long-Term Monitoring and Evaluation
LNAPL	Light Nonaqueous Phase Liquids
MCL	Maximum Contaminant Level

MDL	Method Detection Limits
mg/L	milligrams per liter
NMOC	Non-Methane Organic Carbon
NPL	National Priorities List
OM&M	Semi-Annual Operations, Maintenance, and Monitoring
OM&M&E	Annual Operations, Maintenance, and Monitoring Status and Evaluation Report
OMMP	Final Operations, Maintenance, and Monitoring Plan
O&M Plan	Long-Term Operation and Maintenance Plan
PCBs	polychlorinated biphenyls
PCEs	methane, benzene, vinyl chloride, trichloroethene and tetrachloroethene
PID	Photo Ionization Detector
POC	Points of Compliance
PPE	Personal protective equipment
ppbv	Parts per billion by volume
ppmv	Parts per million by volume
PRPs	Potentially responsible parties
PVC	Polyvinyl Chloride
QAPP	Quality Assurance Project Plan
QA/QC	Quality Assurance/Quality Control
RAWP	Final Remedial Action Workplan
RCRA	Resource Conservation and Recovery Act
RI	Remedial Investigation
RI/FS	Remedial Investigation/Feasibility Study
RV	Recreational Vehicle
ROD	Record of Decision
Site	Waste Disposal, Inc. Superfund Site
SAP	Sampling and Analysis Plan
SCAQMD	South Coast Air Quality Management District
scfm	Standard cubic feet per minute
SFS	Supplemental Feasibility Study
SGPSs	Soil Gas Performance Standards
SOP	Standard Operating Procedures
SOW	Statement of Work
SVOCs	Semi Volatile Organic Compounds
SWPPP	Stormwater Pollution Prevention Plan
TCE	methane, benzene, vinyl chloride and trichloroethene

TGNMO	Total Gaseous Non-Methane Organics
TSS	Total Suspended Solids
Veridian	Veridian Environmental, Inc.
VOA	Volatile Organic Analysis
VOCs	Volatile Organic Compounds
µg/l	micrograms per liter
WDI	Waste Disposal, Inc.
WDIG	Waste Disposal, Inc. Group

1.0 INTRODUCTION

1.1 INTRODUCTION AND PURPOSE

1. This Annual Operations, Maintenance, and Monitoring Status and Evaluation Report (OM&M&E Report) provides:

   - A summary of operation and maintenance activities and monitoring results of the soil gas, in-business air, ambient air, reservoir gas collection system, leachate collection, ground water and stormwater monitoring data collected by the Waste Disposal, Inc. Group (WDIG) during the Third and Fourth Quarters of Fiscal Year (FY) 2006-2007 (the reporting period) at the Waste Disposal, Inc. (WDI) Superfund Site (Site) in Santa Fe Springs, California. Operation and maintenance activities and monitoring results from the First and Second Quarters of FY 2006-2007 are documented in the Semi-Annual Operations, Maintenance, and Monitoring (OM&M) Report dated August 2007 (TRC, 2007).
   - An evaluation of the monitoring and compliance/performance programs and results, including identification of specific contaminant exceedences and locations, discussions of baseline ground water conditions and offsite sources, presentation of statistical analysis and trends, summary of Quality Assurance/Quality Control (QA/QC) activities, discussion of current programs and proposed changes, and schedules and frequency of monitoring and compliance testing.

2. The annual OM&M period spans from October 1 of each year to September 30 of the following year since the Final Combined Construction As-Built, Construction Completion and Remedial Action Completion Report was approved by Environmental Protection Agency (EPA) on September 14, 2006. This report is required under the Amended Statement of Work (SOW) of the Amended Administrative Order, Docket No. 97-09, for the Soil and Subsurface Gas Operable Unit at the Site (Environmental Protection Agency [EPA], 1997a). The OM&M&E activities were performed pursuant to the Final Operations Maintenance and Monitoring Plan (OMMP) by TRC dated August 2006 (TRC, 2006a). It has been prepared to meet the following objectives:

   - Summarize operation and maintenance activities for the remedial systems performed during the Third and Fourth Quarters of FY 2006-2007 by WDIG.
   - Summarize the soil gas, in-business air, ambient air, reservoir gas collection system, leachate collection, ground water and stormwater monitoring data collected during the Third and Fourth Quarters of FY 2006-2007 by WDIG.

- Evaluate the data as to trends or other observations.
- Provide a formal transmittal of laboratory and QA/QC data to the EPA.

1.2 REPORT ORGANIZATION

1. The remaining sections of this OM&M&E Status Report are organized as follows:
    - Chapter 2.0 - Project Background
    - Chapter 3.0 - Summary of Operation and Maintenance Activities and Deviations from Long Term Operation and Maintenance Plans
    - Chapter 4.0 - Summary of Monitoring and Sampling Activities
    - Chapter 5.0 - Monitoring Results
    - Chapter 6.0 - Quality Assurance/Quality Control
    - Chapter 7.0 - Institutional Controls Monitoring and Enforcement Report
    - Chapter 8.0 - Conclusions and Recommendations
    - Chapter 9.0 - References

2.0 PROJECT BACKGROUND

2.1 SITE DESCRIPTION

1. The Site is located in Santa Fe Springs, Los Angeles County, California on an approximately 38-acre parcel of land. It is bordered on the northwest by Santa Fe Springs Road, on the northeast by the former Fedco Distribution Center and a private high school, on the southwest by Los Nietos Road, and on the southeast by Greenleaf Avenue (Figure 2-1).

2. The Site is comprised of 22 parcels. Various businesses are currently operating on 19 of the parcels; 3 of the parcels are currently vacant. Figure 2-2 shows the numbers and names of the owners/tenants of the parcels, and a summary of the existing businesses onsite is presented in Table 2-1.

3. The Site was conceptually divided into eight areas (Area 1 through 8) based on previous uses and conditions during the initial Remedial Investigation/Feasibility Study (RI/FS) period as shown in Figure 2-2. A 42-million-gallon-capacity crude oil reservoir is buried in the central portion of Area 2. The north corner of Area 2 is used for recreational vehicle (RV) and other storage. The remaining portion of Area 2 is undeveloped. Area 1 (located along Santa Fe Springs Road) and Area 8 (located along Los Nietos Road) contain most of the light industrial complexes and small commercial businesses that are present on the Site. Areas 3 through 7 extend along Greenleaf Avenue. Areas 3 and 4 are undeveloped and are the closest property boundary to nearby residential areas (approximately 50 feet). The building located in Area 5 is used for a light industrial business. Areas 6 and 7 are unoccupied and generally vacant, although there are a couple of concrete foundations that remain from previous structures.

2.2 GENERAL SITE HISTORY

1. The reservoir was used for crude oil storage during the Santa Fe Springs oil field development from 1924 to some undetermined time, probably in the 1930's. During this period, various activities were being performed outside the reservoir, including the storage and mixing of drilling muds. It is inconclusive from aerial photograph review whether waste disposal activities were being systematically carried out during this period.

2. Beginning in the late 1940's to early 1950's, the Site was used for disposal of a range of waste and solid fill materials. After 1949, waste disposal activities were regulated under

permit from Los Angeles County, Department of Sanitation until facility closure in 1964. Reliable documentation on disposal was not maintained. As a result, a comprehensive history of Site disposal practices or accepted waste is not available. However, permitted waste included the following: rotary drilling muds; clean earth, rock, sand and gravel; paving fragments; concrete; brick; plaster; steel mill slag; dry mud cake from oil field sumps and acetylene sludge. Investigations have shown that disposed material also included organic wastes, oil refinery waste, solvents, and waste chemicals. Wastes were disposed primarily within the reservoir boundary and in bermed areas surrounding the reservoir. However, field investigations and aerial photograph analyses indicates occurrence of wastes throughout most of the Site.

3. In 1953, the Site began receiving fill material to cover the Site including the reservoir area and unlined bermed disposal pits. The filling of the reservoir area continued until approximately 1966 when grading of the Site was completed.

4. The WDI Site was placed on the National Priorities List (NPL) in July of 1987. In 1988, the EPA initiated a removal action program. During the years 1988 to 1993, EPA performed a RI/FS (EPA, 1993a) which led to a selected remedy for the Site presented in the Record of Decision (ROD) (EPA, 1993b).

5. The Settling Defendants for the Site (a Group of Potentially Responsible Parties who carry out the requirements of the ROD under the Site orders and decrees) organized the WDIG. The WDIG conducted a series of predesign field investigations and treatability studies during 1995 through 2001 under Administrative Order (AO) 94-17 and Amended Administrative Order (AAO) 97-09. The results of these activities were reported in the Remedial Design Investigative Activities Summary Report (Revision 2.0) (TRC, 2001a). After incorporating comments from the EPA and California Department of Toxic Substances Control (DTSC), the report was approved in June 2001.

6. The predesign field investigations changed the conceptual model for the Site and identified additional conditions to those considered for selection of the remedy incorporated in the ROD. Therefore, a Supplemental Feasibility Study (Revision 4.0) (SFS) (TRC, 2001b) was prepared in 2001. Based on results of the SFS, the EPA selected a revised remedy, which was incorporated in the Amended Record of Decision ([AROD], EPA, 2002). A Remedial Design was prepared to construct the remedy presented in the AROD, and the Final (100%) Remedial Design Report (TRC, 2003) was approved by the EPA in June 2003.

7. During development of the AROD, the EPA and WDIG negotiated a Consent Decree (CD) for the implementation of the remedial design. The CD was filed in the United States District Court, Central District of California in 2003 (EPA, 2003). A Compliance Testing Plan (CTP; TRC, 2005) and Compliance Testing Report (CTR) were additional deliverables required under the CD.

8. The implementation of the remedial design at the Site was initiated in March 2004 and the remedial design construction work was performed according to the Final (100%) Remedial Design Report (TRC, 2003), Final Remedial Action Workplan (RAWP) (TRC, 2004) and associated management plans. The remedial construction work has been completed and all construction activities performed onsite were documented in the Construction As-Built Drawings in the Combined Construction Completion Report (TRC, 2006b). The major Site remedial and monitoring systems include:
   - Resource Conservation and Recovery Act (RCRA) Subtitle C-Equivalent Cover
   - RCRA Subtitle D-Equivalent Cover
   - Surface Drainage Control System
   - Gas Migration Control Systems
   - Reservoir Gas Collection System
   - Building Modifications
   - Sentinel Biovent System
   - Leachate Monitoring/Control System
   - Soil Gas Monitoring System
   - Vapor Monitoring Wells
   - Surface Emissions Monitoring
   - Ground Water Monitoring System
   - Stormwater Monitoring System

   The major remedy components are shown in Figure 2-3.

9. The Compliance Testing Plan (TRC, 2005a) described the monitoring and testing requirements and procedures followed for sampling and monitoring during the compliance testing period. The compliance testing period was conducted from December 17, 2005 to

January 17, 2006. The Final Compliance Testing Report (TRC, 2006c) was submitted in June 2006 and approved by EPA on July 27, 2006.

10. Formal OM&M activities began on September 15, 2006. This Annual OM&M&E Report provides a summary of the operations and maintenance activities and evaluation of the soil gas, in-business air, ambient air, reservoir gas collection system, leachate collection, ground water and stormwater monitoring data collected during the Third and Fourth Quarters at the Site. This report is required under the SOW of the Amended Administrative Order, Docket No. 97-09, for the Soil and Subsurface Gas Operable Unit at the Site (EPA, 1997a). Operations and maintenance activities and monitoring and sampling activities conducted during the First and Second Quarters of FY 2006-1007 are summarized in the Semi-Annual OM&M Report dated August 207 (TRC, 2007).

11. Chapter 2.0 summarizes the site's history prior to remedy construction. Post-remedy monitoring results are discussed in Chapters 4.0, 5.0, and 8.0.

2.3 SITE CONDITIONS

1. Soil borings were drilled at the WDI Site for geologic logging and chemical characterization during three primary periods of investigation: the 1988 Remedial Investigation (RI) conducted by EPA and the 1997 and 2002 Remedial Design Investigations conducted by both EPA and WDIG. Constituents detected in waste include volatile organic compounds (VOCs), primarily benzene, toluene, ethylbenzene, and xylenes (BTEX); semi-volatile organic compounds (SVOCs); and heavy metals such as arsenic, chromium, copper, and lead. Waste and contaminated soil have been identified throughout Area 2, which contains the buried reservoir, and in portions of Areas 1, 4, 5, 6, 7, and 8 where other buried wastes have been found.

2. The Remedial Design Report provides a delineation of the buried waste extent. Figure 2-2 shows the locations of the various parcels, what businesses are located on them, and the limits of the waste. Site investigations have shown that 11 of the 22 parcels have structures located over buried waste; 8 other parcels have structures, but waste was not identified underlying the structures. The three unoccupied parcels have underlying waste, but no structures. The buried waste and impacted soil ranges in thickness from an average of approximately 5 to 10 feet to a maximum of 20 feet.

3. Soil gas "hot spots" are present in the subsurface (vadose zone) within and outside the reservoir (i.e., Area 2) in several locations on the Site, including shallow fill soils, buried waste material, and deeper native soils. The "hot spots" are characterized by elevated levels (e.g., exceeding EPA preliminary remediation screening levels) of BTEX, methane, petroleum hydrocarbons, and chlorinated VOCs in soil gas. The primary VOC constituents detected are methane, benzene, vinyl chloride, trichloroethene (TCE), and tetrachloroethene (PCE).

4. Multiple investigations have indicated the presence of perched liquids and/or leachate both within the reservoir. Liquids were encountered within the reservoir at depths ranging between 4 and 12 feet below grade (fbg). The liquids/leachate were found to contain Comprehensive Environmental Response, Compensation and Liability (CERCLA) hazardous substances, including but not limited to VOCs, such as benzene, toluene, ethylbenzene, and vinyl chloride; SVOCs; polychlorinated biphenyls (PCBs); and metals such as arsenic, chromium, and lead.

5. A description of the regional ground water conditions and hydrogeology is included in the AROD. Evaluation of the Site ground water data indicates that the primary VOCs detected are PCE and TCE at concentrations less than 20 micrograms per liter (µg/L). These VOCs have been detected only in the western portion of the Site. Based on ground water flow conditions, the distribution of detections, and information on offsite ground water contamination sites, the sources of the PCE and TCE detected in the monitoring wells in the western portion of the WDI Site appear to be from solvent releases associated with upgradient industrial sites and/or other sources. Elevated concentrations of aluminum, iron, manganese, and selenium have also been detected in ground water samples; in some cases above primary or secondary drinking water standards. The fact that these metals are detected uniformly across the Site suggests that the concentrations reflect regional water quality conditions and are not related to onsite sources.

2.4 SUMMARY OF SITE MEDIA CHARACTERIZATION

2.4.1 SOIL GAS CHARACTERIZATION

1. Initial soil gas characterization work was performed by EPA in 1988 during Remedial Investigation Activities (EBASCO, 1989).

2. Supplemental soil gas investigative activities were conducted by WDIG and the EPA during 1997 and 1998, under the Remedial Design Investigative Activities Workplan (TRC, 1997) and the Subsurface Gas Contingency Plan (EPA, 1997b). Activities included geoprobe soil gas screening, two soil gas monitoring events, in-business air monitoring, the installation of 32 vapor wells by WDIG and the EPA in 1998 and completion of 24 soil gas monitoring rounds from 1998 to 2003. Figures 2-3 and 2-4 show the existing vapor well locations after completion of remedial construction activities.

3. Primary objectives of the current soil gas monitoring activities are:
   - Determine current soil gas conditions in the following areas:
     - Site perimeter (Compliance Vapor Wells).
     - Adjacent to onsite structures (Non-Compliance Vapor Wells).
     - Site interior (Non-Compliance Vapor Wells).
   - Determine trends in the historical data.
   - Evaluate if other compounds not assigned site-specific action levels pose a Site risk.

4. Interim Threshold Levels (ITLs) for benzene and vinyl chloride, which were established as part of the Subsurface Gas Contingency Plan (EPA, 1997b) and the Amended Administration Order Docket 97-09 (EPA, 1997a), are based on the potential migration of subsurface gas into onsite businesses. A more detailed description of the rationale for these ITLs is provided in the Amended Administrative Order and the Subsurface Gas Contingency Plan (EPA, 1997a and 1997b).

5. To address the risks from methane, EPA used the California Integrated Waste Management Board's (CIWMBs) methane action level in buildings as their criteria:
   - Methane levels in buildings will be below 1.25 percent (i.e., 25 percent of the methane lower explosion limit of 5 percent).
   - Subsurface methane levels at the Site boundary must be below 5% based on CIWMB requirements. An ITL of 1.25 percent was used by EPA in evaluating the results of the Subsurface Gas Contingency Plan Investigations Report (CDM Federal, 1999a).

6. As part of the Soil Gas Contingency Plan work, referenced in paragraphs 2 and 4 of this section, EPA developed ITLs for the chemicals determined to present potential health risks based on chemical toxicity and relative concentrations at the Site. Subsequent to establishing the ITLs, EPA adopted standards for soil gas as part of development of the AROD. The soil gas standards are for comparison with gas concentrations in the subsurface. Table 2-2

provides a summary of the updated soil gas performance standards (SGPSs). Table 2-2 also provides a summary of the updated indoor air threshold levels (IATLs) for the Site Chemicals of Concern (COCs). The IATLs are for comparison with concentrations of gas Constituents measured in Site buildings (i.e., in-business air) and ambient air, as described in Section 2.4.2.

2.4.2 IN-BUSINESS AND AMBIENT AIR CHARACTERIZATION

1. The objective of in-business air monitoring is to assure that soil gas from the Site is not infiltrating into onsite buildings. Figure 4 shows the existing in-business and ambient air locations after completion of remedial construction activities.

2. The in-business air sampling was initiated in February 1998. Results from the first 3 months of monitoring indicated that soil gas infiltration was not occurring. Based on those results, monitoring was reduced to quarterly, concurrent with the vapor well monitoring program, which continued through 2000. With EPA's concurrence, semi-annual monitoring began in 2001. Semi-annual monitoring was discontinued prior to the remedial construction activities. Routine quarterly monitoring was initiated with the OM&M activities.

2.4.3 RESERVOIR GAS CHARACTERIZATION

1. The Reservoir Gas Collection System, which is the active treatment component of the gas migration control system, collects and treats gas from the reservoir area underneath the RCRA C-equivalent cover. The engineering details of the Reservoir Gas Collection System are available in the Final (100%) Remedial Design Report (TRC, 2003a) and Final RAWP (TRC, 2004a). Figures 2-3 and 2-4 show the location of the Reservoir Gas Collection System.

2. Performance requirements for the Reservoir Gas Collection System are mainly developed to meet the emission standards established by the South Coast Air Quality Management District (SCAQMD) as well as the Applicable or Relevant and Appropriate Requirements (ARARs) for COCs in subsurface soil gas.

3. During the compliance period, the system was monitored for compliance with the SCAQMD VOC emission rate standard of 1 pound per day, and the system performance requirement of reducing non-methane organic carbon (NMOC) by at least 98 percent by

weight or reducing NMOC concentration to less than 20 parts per million volume (ppmv) dry basis as hexane at 3 percent oxygen.

4. Long-term performance requirements are monitored during the OM&M phase and include evaluation of the system function, which may be switched to passive treatment if an acceptable methane emission rate (i.e., methane emission rate less than 2.3 lb per day after 1 year) and quality requirements can be maintained at a passive treatment level.

2.4.4 LEACHATE CHARACTERIZAION

1. The performance requirements of the leachate monitoring/control system were determined from the monitoring requirements in the SOW (EPA, 1997a). The performance requirement for leachate accumulation in the control system wells is set at 12 inches, which means that the leachate accumulation in the wells shall not be greater than 12 inches in depth. If leachate accumulation exceeds 12 inches, it will be removed and disposed offsite. Monitoring of leachate level and procedures for removing excessive leachate are discussed in Section 3.5.

2. During the compliance period, the leachate accumulation in the leachate monitoring/control system was monitored weekly. During monitoring, liquid levels in the leachate collection wells were found to recover at a rate that required an increase in the monitoring frequency from weekly to bi-weekly. This monitoring frequency has continued through the first 6 months of OM&M. Figure 2-3 shows the locations of the Leachate Collection Wells installed as part of the remedial construction activities.

2.4.5 GROUND WATER CHARACTERIZATION

1. As part of the RI/FS process, 27 ground water wells were installed at the Site, with the majority of the wells screened at 1988 water table elevations. Four wells extend to about 50 feet below the water table. Two additional wells (GW-32 and -33) were installed in January 2001 by TRC. Several wells were subsequently closed to facilitate the remedial construction activities. Figures 2-3 and 2-4 show the ground water monitoring well locations remaining after completion of the remedial construction activities.

2. During irregularly spaced monitoring events from November 1988 through September 1997, the following ground water conditions were observed (CDM Federal, 1999a):

- TCE and PCE exceeding Maximum Contaminant Levels (MCLs) (5.0 μg/L) found in wells located in the western portion of the Site. These wells are in the upgradient position of the Site.
- Light nonaqueous phase liquids (LNAPL) and dense nonaqueous phase liquids (DNAPL) were not been observed in the ground water samples.
- Primary metals (i.e., arsenic, chromium and lead) were detected at low concentrations exceeding MCLs (0.05 milligrams per liter [mg/L] for arsenic, chromium, and lead) during isolated sampling events. These concentrations were observed in upgradient, cross-gradient and downgradient wells at the Site indicating they are not a Site specific condition.
- Elevated concentrations of aluminum, iron, manganese and selenium reflected a regional ground water condition, not a site-specific condition.

3. Subsequent monitoring events between 1997 and 2003 also reported similar findings.

4. The AROD (EPA, 2002) concluded that the Site has not contributed to the exceedances of ground water MCLs based on extensive monitoring. Some contaminants are detected upgradient or laterally away from WDI waste sources and in relatively deep water bearing zones. Although several COCs (VOCs and metals) have been detected above their respective State drinking water MCLs in ground water samples, these exceedances do not appear to be related to Site wastes based on their distribution in ground water.

5. Ground water was monitored semi-annually as part of OM&M activities. The primary objectives of the Long-Term Ground Water Monitoring Plan are to establish a detection monitoring program for identifying changes in ground water elevation (to monitor changes in ground water velocity and flow direction) and potential releases, leaching, or migration of waste materials from onsite sources to the ground water. A further objective is to locate onsite background wells such that they can also be utilized to track the movement of contaminants from offsite sources.

2.4.6 STORMWATER CHARACTERIZATION

1. The stormwater pollution prevention plan (SWPPP) for WDI (TRC, 1998) has two major objectives. The first is to identify existing and potential sources of stormwater pollution at the Site, if any. The second is to propose and implement necessary practices that would reduce the introduction of potential pollutants into stormwater discharges associated with the Site if any are identified.

2. The SWPPP was designed to cover the undeveloped areas of the Site (Areas 2, 3, 4 and 7). The remaining areas (Areas 1, 5, 6 and 8) have existing or abandoned light industrial businesses, which are responsible for their own stormwater management practices.

3. Initially, a total of five stormwater monitoring points were designated. However, after completion of the remedial construction activities in 2006 and with EPA approval, the monitoring points were increased to six as shown in Figure 2-5.

3.0 SUMMARY OF OPERATION AND MAINTENANCE ACTIVITIES AND DEVIATIONS FROM LONG-TERM OPERATION AND MAINTENANCE PLAN

1. This section presents a summary of the O&M activities performed for the Site remedial systems during the Third and Fourth Quarters of FY 2006-2007. This section also identifies any deviations from the Long-Term Operation and Maintenance Plan (O&M Plan) that were implemented during the period, if any. The O&M activities include:

   - Inspection of the RCRA Subtitle C-equivalent and Subtitle D-equivalent covers.
   - Reservoir gas collection, venting and treatment system operation, inspection and carbon changeouts.
   - Ground water and soil vapor monitoring well inspections.
   - Biovent well inspections.
   - Stormwater drainage system inspections.
   - Monitoring of leachate levels and leachate removal.
   - Landscape maintenance.
   - Site security.
   - Reporting.

   The locations of major remedy components listed above are shown in Figure 2-3. Design and engineering details of the remedy components are available in the Final (100%) Remedial Design Report (TRC, 2003), Section 2.0 of the RAWP (TRC, 2004), and the Combined Construction Completion Report (TRC, 2006b).

2. The required O&M activities are described in the O&M Plan. The O&M Plan is a part of and described in the OMMP (TRC, 2006a). The OMMP identifies the inspection/monitoring frequency and includes the Inspection and Monitoring Data Sheets for the Site remedial systems identified above.

3. Tenants who may be affected by O&M or monitoring activities were notified at least one week in advance of the activities. The notifications were made by the WDIG Coordinator or the OM&M Supervising Contractor. The methods of notification included telephone, e-mail and/or direct contact. A list of current tenants is presented in Table 2-1, which has been updated as necessary to reflect changes in tenants and landowners that may have occurred since the last reporting period.

3.1 INSPECTION OF RCRA EQUIVALENT COVERS

1. The performance requirements and frequency of O&M activities for the RCRA equivalent covers are summarized in Table 3-1.

2. The RCRA Subtitle C- and D-equivalent covers (Figure 2-3) were visually inspected during the Second Quarter (January 2007) for signs of erosion, settlement, vegetative growth, and cracks and fractures in asphalt/concrete surface areas by the OM&M Supervising Contractor. The results were presented in the prior reporting period Semi-Annual OM&M Report (TRC, 2007) and are summarized again herein. The condition of the slope along the northwest perimeter of Area 2 close to VW-46, BW-24 and BW-25 (see Figure 2-3) was also inspected for signs of erosion and/or settlement (e.g., cracking, slippage, etc.) during this initial inspection. Copies of the RCRA Subtitle C-equivalent cover and Subtitle D-equivalent cover O&M Inspection Sheets are included in Appendix A.1. The following are the key observations from this initial inspection of the RCRA covers:
    - Erosion: Erosion was not observed on the cover areas or on the northwest slope.
    - Settling: Settling was not observed on the cover areas or on the northwest slope.
    - Cracks: Cracks were not observed on the cover areas or on the northwest slope.
    - Vegetation Growth: Vegetation on the covers consisted of mostly dormant grasses and some weeds due to minimal rainfall in the months prior to the inspection.
    - Weed Control: Some weeds were observed on the cover areas but growth was limited due to minimal rainfall. Weed growth is under control by a landscape contractor.
    - Animal Burrows: Animal burrows were not observed on the cover areas or the northwest slope.
    - Vectors: Vectors (mice, rats, or mosquitoes) were not observed on the cover areas.
    - Anchor Trench: Settlement was not observed. The cleanouts for the French Drain collection piping were observed to be clear. At the time of inspection, water was not being discharged from the French Drain dewatering pipe.
    - Road Condition: Settlement, ruts, or potholes were not observed. The road is surfaced with aggregate base material and is in good condition.
    - Other: Other issues or conditions of concern were not noted.

3. Problems relating to the RCRA equivalent covers were not observed during the inspection and follow-up maintenance activities were not necessary.

4. A formal inspection of the RCRA covers was performed by an independent engineer per the requirements of Title 22, Section 66264.228(k), (p) and (r). Also, throughout the reporting period, the independent engineer conducted informal inspections of the Site and observed no settlement or erosion issues. Also, the O&M activities for the RCRA Subtitle C-equivalent cover were performed to meet the requirements of Title 22, Section 66264.310.

5. An annual survey was conducted during the Fourth Quarter on the RCRA Subtitle C- and D- equivalent covers by a California State licensed land surveyor to determine the horizontal location and elevation (i.e., settlement) of the settlement monuments. The survey located the settlement monuments according to the state-plane coordinate system and elevation pursuant to the North American Vertical Datum (NAVD, 1988) system. Local benchmarks used throughout the project history were used for survey control points. The survey had an accuracy of ± 0.01 foot.

6. The survey results indicate settlements ranging from 0.17 to 0.20 feet in six of the seven monument locations, including at SM-07 (the control location) which is located outside of waste areas (the control location). One monument location, SM-01, could not be surveyed in October 2007 due to the presence of storage equipment over the area. A copy of the survey is included in Appendix A.1, and settlement monument survey elevations from both the initial survey in January 2005, after remedial construction activities, and the most recent survey in October 2007 are listed on Figure 3-1.

7. The surface drainage control system at the Site was sized to accommodate the 100-year, 24-hour storm. The final surface grades were designed to average 2 to 3 percent to allow long-term drainage, radially away from the center of the Site. Surface grades were examined during the annual RCRA cover inspection at the Site in January 2007 and again during the annual survey in October 2007. Deviations from as-built grade will be visually observed and maintenance conducted, as necessary to mitigate potential for ponding.

8. A single lane access road provided on the Site allows access from Greenleaf Avenue to the Reservoir Gas Collection System. A turnaround is provided at the reservoir gas collection system. The access road cross-section consists of a 10-foot-wide, 6-inch-thick, crushed aggregate base coarse that is integrated within the top cover of RCRA Subtitle C-equivalent

and Subtitle D-equivalent cover areas. As noted in Item 2 above, the access road was inspected during the Second Quarter annual inspection of RCRA covers and again during the annual survey in October 2007. Based on these inspections, repairs to the access road were not necessary. The concrete paved ramp on the west side of the RCRA cover areas for access onto Parcel 26 was also inspected. The paved access ramp was found to be in good condition.

3.2 SOIL GAS MIGRATION CONTROL SYSTEM

1. The soil gas migration control system includes:
   - Reservoir Gas Collection System
   - Building Modifications
   - Sentinel Biovent System

   Manufacturer manuals for O&M of equipment along with maintenance schedules related to these systems are provided in the OMMP (TRC, 2006a). Start-up/Shut down procedures for the soil gas migration control system can be found in the Soil Gas Collection, Venting and Treatment System Startup Protocol (TRC, 2005b).

2. The performance requirements and frequency of O&M activities for the soil gas migration control system are summarized in Table 3-1.

3.2.1 RESERVOIR GAS COLLECTION SYSTEM

1. The Reservoir Gas Collection System consists of a gas collection geocomposite layer incorporated in the RCRA C-equivalent cap and perforated collection piping in gravel filled trenches under the cap that is connected to an aboveground gas treatment system. The gas treatment system consists of a blower, granular activated carbon canisters for removal of organic vapors, vent stack, and an electrical control system. The gas treatment system also includes an autodialer that will contact the designee of the O&M Supervising Contractor in case of system shutdown. If the auto dialer is activated by the system, a technician will be called to the Site to observe conditions, perform any necessary repairs and/or restart the system.

2. The Reservoir Gas Collection System can be operated in either an active or passive mode. The system was operated in an active mode (i.e., under suction provided by the blower in the gas treatment system) during this reporting period. After the first year of O&M

activities (end of Fourth Quarter of 2007), the performance data was reviewed to determine if a change to the passive mode (i.e., system no longer under vacuum using blower; only venting to atmosphere) was appropriate. The "trigger" for switching to the passive mode is based on the methane collection rate being below 2.3 lbs/day. Due to the rate of methane collection being generally below this threshold value (only exceedance of methane collection was in September 2007), it was determined that the Reservoir Gas Collection System could be switched to passive mode for the start of the second year of O&M activities in 2008. The system was switched to passive mode on December 10, 2007.

3. Monthly O&M inspections were performed for the Reservoir Gas Collection System during this report period. The O&M Inspection Sheets for the Reservoir Gas Collection System are included in Appendix A.2.

   The following are the key observations and comments from the monthly inspections of the Reservoir Gas Collection System:

   - Gate, Lock and Fence: The gate, lock, and fence were found to be in good condition during this reporting period.
   - Electrical Meter and Controls: The electric meter and controls were found to be in good condition during this reporting period.
   - Auto-Dialer: The auto dialer was found to be in good condition during this reporting period.
   - Equipment (Vent Stack, Knockout Pot, Blower, Carbon Canisters, Hoses, Fittings, Piping, Instruments, etc.): All equipment was found to be in good condition during this reporting period.

4. Problems relating to the Reservoir Gas Collection System O&M activities were not observed during the inspections and follow-up maintenance activities were not necessary.

5. Based on the vapor inlet and outlet sample results from the carbon canisters, it was determined that a carbon replacement was appropriate. In preparation for the replacement, samples of the spent carbon in the canisters were collected during this reporting period and analyzed for profiling by the carbon vendor. Based on the results, the carbon was classified as

   non-hazardous. The spent carbon was removed and replaced with new granular activated carbon on June 5, 2007. The spent carbon was transported offsite for regeneration. The non-hazardous waste manifest is included in Appendix A.2.

6. Since the system was switched to the passive mode on December 10, 2007, the O&M inspections will be performed semi-annually per the OMMP.

3.2.2 BUILDING MODIFICATIONS

1. The O&M for the Building Modifications involve review of in-business air monitoring results. If site-related constituents are detected from in-business air monitoring above Indoor Air Threshold Levels (Table 2-2), the affected parcel(s) will be inspected more frequently than the annual inspection frequency. Changes in inspection frequency will be based on the Decision Matrix for In-Business and Ambient Air Monitoring (see Section 4.1.2). The parcel inspections will involve inspecting building foundations and locations where filling or re-sealing of cracks have been performed, in addition to other areas covered with RCRA Subtitle D-equivalent covers.

2. Based on the in-business air monitoring results noted in Section 5.1.2 for this reporting period, the parcel inspection will remain annual. During the First Quarter 2007, eighteen of the twenty-one parcels were inspected. Inspections of all twenty-one parcels will be performed during the First and Second Quarters of FY 2007-2008. The O&M Parcel Inspection Sheets from the First Quarter of FY 2006-2007 are included in Appendix A.3. The following are the key observations and comments from the inspections of the parcels:
   - Cracks: Minor hairline cracks were observed in the crack sealing material in the engineered concrete areas in Parcels 21 and 41. The hairline fractures appeared to be "surface" cracks and do not penetrate through the sealant.
   - Damage/Penetrations: Damaged areas and/or penetrations were not observed in the specified parcel areas.
   - Erosion: Erosion was not observed on the parcels.
   - Photoionization Detector (PID) Survey: A maximum reading of ~16 ppmv was detected in Parcel 21 inside the building above the engineered concrete. The background PID reading was ~1 ppmv.
   - Other: Other issues or conditions of concern were not noted.

3. Other than the minor surface hairline fractures noted in the crack sealing material in the engineered concrete areas in Parcels 21 and 41, items relating to the parcels were not observed during the inspections and follow-up maintenance activities were not necessary.

3.2.3 Sentinel Biovent System

1. The Sentinel Biovent System consists of 24 passive biovent wells at the perimeter of areas where waste is located as shown in Figure 2-3. A semi-annual inspection was performed for each well during this reporting period to verify the integrity of well head components. The O&M Inspection Sheets for the Sentinel Biovent Wells are included in Appendix A.4. The following are the key observations and comments from the semi-annual inspections of the Sentinel Biovent Wells:
   - Wellhead (Vented Steel Enclosure, Lock, Concrete Base, Baroball Valve): The wellhead components were found to be in good condition at the time of inspection.
   - Well Casing: The casings were found to be in good condition at the time of the inspection.
   - Erosion Around Wellhead: Erosion around the wellheads was not observed at the time of inspection.

2. Problems relating to the Sentinel Biovent Wells were not observed during the inspection and follow-up maintenance activities were not necessary.

3.3 GROUND WATER AND SOIL VAPOR WELLS

1. The performance requirements and frequency of O&M activities for ground water and soil vapor monitoring wells are summarized in Table 3-1.

2. The ground water and soil vapor monitoring wells were inspected during each monitoring event (third and fourth quarters) for well head integrity and surrounding area conditions (i.e., heavy vegetation, construction debris, equipment storage, etc.). The locations of the wells are shown in Figures 2-3 and 2-4. The O&M Inspection Sheets for the Ground Water Monitoring Wells and Soil Vapor Monitoring Wells are included in Appendices A.5 and A.6. Due to an oversight, soil vapor monitoring well field sheets from the Third Quarter of FY 2006-2007 were misplaced and not included in Appendix A.6. The following are the key observations and comments for this period regarding inspections of the wells:
   - Wellhead (Well Box, Cover, Gasket and Concrete): The well box and concrete pad for VW-25 was replaced during this monitoring period due to cracking of the concrete pad and well box displacement. The wellhead components of the remaining wells were found to be in good condition at the time of inspection.
   - Well Lock and Casing Cap/Plug: The locks, casings and cap/plugs were found to be in good condition at the time of the inspection.

- Erosion Around Wellhead: Erosion around the wellheads was not observed at the time of inspection.

3. Problems relating to the ground water and soil vapor wells were not observed during the inspections and follow-up maintenance activities were not necessary.

3.4 STORMWATER DRAINAGE SYSTEM

1. The performance requirements and frequency of O&M activities for the stormwater drainage system are summarized in Table 3-1.

2. The stormwater drainage system consists of berms, swales, ditches, cleanouts, drainage piping from the french drain of RCRA Subtitle C-equivalent cap and a precast concrete catch basin near the northeast corner of the Site. Figure 3-2 shows the major drainage systems at the Site. The stormwater drainage system was inspected for excessive vegetation, sedimentation and debris in the channels and around the drains and catch basin inlet, and for soil erosion.

3. Control of stormwater runoff is provided by the stormwater drainage system. Stormwater runoff at the Site is also conveyed through sheet flow and concentrated areas of surface flow. Berms (either soil, sandbags, asphalt, or concrete) concentrate the sheet and surface flows and direct it towards historical stormwater discharge points along the perimeter of the RCRA covers and onto the perimeter parcels or into storm drains. Natural and planted vegetation is used at the Site to reduce surface erosion and help control surface water flow. During the establishment of cover vegetation in this reporting period, Best Management Practices (BMPs) were implemented to minimize silt and debris from leaving the Site. BMPs include the installation of straw wattles, hay bales, sand bags, silt fencing, detention basins and/or a combination of these sediment control measures prior to the beginning of the wet season and during/after significant storm events if necessary.

4. The implemented BMPs were examined during the inspection of the stormwater drainage system. The stormwater drainage system was inspected one time during the Second Quarter of FY 2006-2007 (January 2007). Unscheduled inspections of the stormwater drainage system were not performed since significant storm events with accumulated precipitation greater than 2 inches over a 24-hour period did not occur during this monitoring period.

5. For the inspection of the Stormwater Drainage System (berms, swales, ditches, cleanouts, drainage piping from French Drain of RCRA Subtitle C-equivalent cap and precast concrete catch basin near the northeast corner of the Site), an O&M Inspection Sheet was completed. The O&M Inspection Sheet for the Stormwater Drainage System is included in Appendix A.7. The following are the key observations and comments from the inspection of the system:

   - Catch Basin (near northeast corner): A minor amount of sediment was observed in the catch basin. The sediment did not require removal.
   - Drain Pipe from French Drain: A small amount of water was draining from the pipe during the inspection; the pipe did not appear to be blocked.
   - Cleanouts for French Drain: The cleanouts were opened and appeared to be clear of liquid and/or foreign material. Also, the ring and cover of each cleanout was in good condition.
   - Sediment Buildup: Sediment buildup was not observed in the drainage system.
   - Vegetation Growth: Vegetation growth was minimal in the drainage system components due to lack of rainfall.
   - Erosion: Erosion was not observed.
   - Settlement: Settlement was not observed near the stormwater drainage features.
   - Cracks: Cracks were not observed in the stormwater drainage features.
   - Other: Some minor sediment accumulation occurred at Parcel 26 in an informal detention basin located at the gate of the driveway to Parcels 29 and 30. The sediment did not require removal.

6. Problems relating to the Stormwater Drainage System were not observed during the inspection and follow-up maintenance and/or repair activities were not necessary.

3.5 LEACHATE MONITORING/CONTROL SYSTEM

1. The performance requirements and frequencies of O&M activities for the leachate monitoring/control system are summarized in Table 3-1.

2. The leachate monitoring/control system consists of four Leachate Collection (LC) Wells. The locations of LC Wells are shown in Figure 2-3. The O&M of the four LC Wells consisted of monitoring and recovery of leachate that accumulated in the wells as well as

inspections. During this reporting period from April 2007 to September 2007, the inspections were performed twice each week.

3. Based on the LC Well monitoring and bailing results discussed in the Final Compliance Testing Report (TRC, 2006c), a management strategy was developed to reduce and maintain the leachate levels in the LC Wells at or below 12 inches above the bottom of the well. The strategy is intended to maintain liquid levels in the LC Wells throughout the OM&M period in accordance with the ARARs and performance criteria. Specifically, if the liquid level in an LC Well reaches 12 inches or more, the liquid was removed from the well and stored onsite pending transportation/disposal to an approved facility.

4. From April 2007 through September 2007, the liquids management strategy consisted of monitoring and bailing (if necessary) on a frequency based on the measured liquid level in each well. In general, the strategy for determining frequency of bailing consisted of the following:
   - Liquid Level <12 inches prior to liquids removal: Monitor Liquid Level Monthly. Bail liquids to below 12 inches if the liquid level is >12 inches and increase monitoring frequency if the liquid level remains above 12 inches for 2 consecutive monthly monitoring periods.
   - Liquids Level 12 to 36 inches prior to liquids removal: Weekly monitoring and bailing to below 12 inches.
   - Liquid Level 36 to 72 inches prior to liquids removal: Twice weekly monitoring and bailing to below 12 inches.
   - Liquid level >72 inches: Limited duration pumping. A recharge test will be conducted prior to discontinuing pumping.

5. From April 2007 through September 2007, LC-1, LC-2 and LC-4 were monitored and bailed twice weekly. LC-3 was monitored once per week and bailed if necessary. The liquid levels in LC-2 and LC-4 exceeded 72 inches prior to liquids removal each week and, therefore, a temporary pumping system for each well was designed and installation started during this reporting period. Installation was completed and start-up initiated during the First Quarter of FY 2007-2008.

6. Reporting on LC Wells monitoring and bailing occurred both as part of progress calls and in reports submitted periodically to the WDIG Coordinator. A summary of the monitoring and bailing results is presented in Section 5.2. The O&M Inspection Sheets for the Leachate

Monitoring/Control System are included in Appendix A.8. The following are the key observations and comments regarding the wells during this monitoring period:

- Wellhead (Well Box, Cover, Gasket and Concrete): The wellhead components were found to be in good condition at the time of inspection. Some well box gaskets were replaced as necessary during the reporting period.
- Well Lock and Casing Cap/Plug: The locks, casings and cap/plugs were found to be in good condition at the time of the inspection.
- Liquid Present in Well Box: Liquids present inside of well boxes from bailing activities were removed during O&M visits as necessary. Care was taken to minimize spilling of liquids both inside and outside of the well boxes during bailing activities.
- Erosion Around Wellhead: Erosion was not observed during the reporting period.

7. Problems relating to the Leachate Monitoring/Control System O&M were not observed during the inspections and follow-up maintenance activities were not necessary other than the following minor items. Well boxes were cleaned periodically to remove liquids accumulated during bailing activities and some gaskets were replaced as necessary.

8. Monitoring and bailing activities were discontinued in November 2007 due to construction of an automatic liquids recovery system for wells LC-2 and LC-4. The system was started in December 2007, at which time weekly monitoring and bailing of wells LC-1 and LC-3 resumed.

3.6 SITE SECURITY

1. The performance requirements and frequencies of O&M activities for the Site Security features are summarized in Table 3-1.

2. Inspection of the perimeter fencing, gates, and other Site security features was conducted during this reporting period. Partial inspections were also performed during each visit by O&M Supervising Contractor personnel and reported on daily field sheets. These inspections included checks for vandalism or other damage to Site security features such as fencing, gates, and locks. The integrity of the fence was checked to insure that the fencing was secure (e.g., no holes or breaks) and gates were working properly and locks were in place.

3. A 20-foot-high "stray ball" fence is constructed along the top of the north slope at the boundary with St. Paul High School. This is the area where stray balls may land during field play at the athletic field of the high school. The stray ball fence is not meant to be part of the Site security measures and controls, but is intended to reduce the potential for stray balls to be lost and to control unauthorized access onto the Site. A man-gate is provided between the perimeter security fence and the High School athletic field. The stray ball fence was inspected for damage, such as rips/tears in the fabric or loose steel cables/hardware, during the Site security inspection.

4. The O&M Inspection Sheets and Daily Field Reports for the Site Security features are included in Appendix A.9. The following are the key observations and comments for this period regarding the security features:
   - Security Fencing: The security fencing was observed to be in good condition. Small damaged areas were noted and repaired.
   - Erosion/Undermining: Erosion or undermining was not observed during the inspections.
   - Access Gates and Locks: Access gates were in good condition and locks were in place during the inspections.
   - Warning Signs: Warning signs were in place along the perimeter fence during the inspections.
   - Stray-Ball Fence: The stray ball fence was found to be in good condition during the inspections.
   - Other: Other security issues or conditions of concern were not noted.

5. Problems relating to the security features were not observed during the inspections and follow-up maintenance activities were not necessary with the exception of the following:
   - Minor repairs to damaged fencing.
   - Removal/painting over graffiti.

   Partial inspections were also performed during each visit by O&M Supervising Contractor personnel and reported on daily field sheets. These inspections included checks for vandalism or other damage to Site security features such as fencing, gates, and locks. The integrity of the fence was checked to insure that the fencing was secure (e.g., no holes or breaks) and gates were working properly and locks were in place. The response time to repair security features is typically one week. If the response time exceeds one week, interim measures will be taken to prevent trespassing.

3.7 LANDSCAPE AND VEGETATION MAINTENANCE

1. The performance requirements and frequencies of O&M activities for the landscape and vegetation maintenance are summarized in Table 3-1.

2. The purpose of landscape maintenance is to maintain the overall aesthetic quality of the Site. Maintenance of the landscaping included irrigation of the trees and shrubs near the high school to the northeast of the Site, and periodic Site maintenance work such as mowing the capped areas and pruning trees and shrubs, and removal of unwanted weeds. Irrigation of the landscape vegetation near the school continued during this reporting period and will continue until the planted shrubs become established and can live without further irrigation. The frequency and duration of watering was implemented according to the recommendations of the subcontractor that performs the landscaping work.

3. The following table summarizes the landscape and vegetation maintenance tasks, performance standards and activities performed during this reporting period.

LANDSCAPE/VEGETATION PERFORMANCE STANDARDS, TASKS AND ACTIVITIES

TASK	PERFORMANCE STANDARDS	ACTIVITIES THIS PERIOD
Vegetative Cover Mowing	Maintain neat appearance, allow easy access to monitoring wells	Mowing activities did not occur during this reporting period due to limited rainfall and minimal vegetation growth.
Vegetative Cover Replacement	70 percent vegetation coverage	The condition of the shrubs and planted vegetation is good. The cap vegetative cover appeared to be below 70 percent during this reporting period (end of dry season). However, coverage has exceeded 70 percent during the following reporting period as shown in Figure 3-3
Tree Pruning	Promote healthy growth of site trees, prevent damage to stray ball fence, plant off-site encroachment	Tree pruning was not required during this monitoring period.
Landscape Area Weed Control	Maintain healthy appearance of trees, bushes and ground cover	Weed removal is under control by routine landscaper maintenance. Ground cover (honeysuckle) is growing very well. Additional weed removal activities were performed prior to St. Paul High School events
Site Housekeeping	Removal of debris, trash or wastes from the Site.	Site housekeeping was observed to be in good condition

4. Based on informal qualitative acceptance criteria for vegetation/ground-cover growth employed by California State Agencies, counties and cities, a 70 percent vegetation coverage over the RCRA Subtitle C- and D-equivalent covers is considered acceptable for the Site. A vegetation inspection was performed during compliance testing in 2006 to evaluate vegetation growth. Based on the inspection, it appears that the total area of the RCRA covers remains just below the 70 percent vegetation threshold level. This is primarily due to the below normal rainfall that has occurred over the past two years, with this past season being one of, if not, the lowest in recorded history. A determination of the need to re-establish vegetation in areas that are substandard will be made after more average rainfall seasons have occurred. If the re-establishment of vegetation is determined necessary, it will be scheduled to occur at the appropriate time of the year to support re-growth (e.g., re-seeding will occur early in the rainy season). It is noted that winter rainfall that occurred after this reporting period has returned to more normal levels and the vegetative growth over the cap areas is above the 70 percent threshold level as shown in Figure 3-3.

5. As part of O&M activities, landscape maintenance inspections are performed every two months. The O&M Inspection Sheets for the Landscape and Vegetation Maintenance are included in Appendix A.10. The following are the key observations and comments from the landscape inspections:

   - Condition of Shrubs and Planted Vegetation: Shrubs and planted vegetation were found to be in good condition during the inspections. Ground cover (honeysuckle) is growing very well. Photographs documenting the condition of shrubs and planted vegetation are included in Appendix A.10.
   - Irrigation System Operation: The irrigation system was in good condition and operating properly.
   - Weed Growth: Weed removal is under control by routine landscape maintenance.
   - Erosion Around Planted Vegetation: Erosion around planted vegetation was not observed.
   - Vectors: Gopher holes were observed in some locations on the site during inspections. Efforts to control the gopher population at the site such as use of "Gopher-Be-Gone" were implemented during this reporting period. Other vectors (mice, rats, or mosquitoes) were not observed in the landscape areas.
   - Site Housekeeping: Site housekeeping was observed to be in good condition.

- Other: Other landscaping issues or conditions of concern were not noted during this reporting period.

6. Problems relating to the Landscape Maintenance were not observed during the inspections and follow-up maintenance activities were not necessary. Additional landscape maintenance was conducted prior to St. Paul High School events.

3.8 PROBLEM IDENTIFICATION, CORRECTIVE ACTION, AND MAINTENANCE AND REPAIR ACTIVITY REPORTING

1. As noted in the OMMP (TRC, 2006a), if problems or conditions are identified that warrant action or attention, a Problem Identification and Corrective Action Report will be prepared and submitted to the WDIG Coordinator and EPA for approval. If the recommended corrective action is approved and the work performed, a Maintenance and Repair Activity Report will also be prepared and submitted to the WDIG Project Coordinator. These reporting requirements are for major maintenance and/or repairs to the remedial systems that have a material impact on the operation or performance of the remedial components and are not for minor maintenance and repair items.

2. Major maintenance and/or repair to the remedial systems did not occur during this reporting period and, therefore, Problem Identification and Corrective Action Reports were not submitted. Minor repairs were performed as noted in the O&M activities described in the prior sections of this report.

3.9 MANAGEMENT AND REPORTING

1. All O&M related records (i.e., Site O&M inspection sheets, Daily Field Reports, etc.) are being kept on file by the OM&M Supervising Contractor and have been included in this Annual OM&M&E Report.

2. In addition, the WDIG Project Coordinator will notify EPA of any non-compliance events (e.g., vapor well or in-business air emissions in excess of required limits) when they occur (e.g., each event).

3.10 REVISIONS TO THE O&M PLAN

1. The O&M Plan is an "evergreen" document that is subject to revision. Revisions may be proposed by the WDIG Project Coordinator for EPA review and approval. Alternatively, the EPA, subject to the governing decision documents for the Site (e.g., AROD, CD/SOW, Remedial Design and related deliverables), may direct WDIG to prepare revisions to the O&M Plan for EPA review and approval to address deficiencies or needed enhancements. Such revisions may include, but are not limited to, revisions in Standard Operating Procedures (SOPs), corrective actions, or instrumentation to address potential monitoring or safety concerns.

2. Based on the O&M activities performed and observations made during this reporting period, revisions to the O&M Plan are not proposed by the WDIG Project Coordinator.

3. The EPA did not request or direct the WDIG Project Coordinator to prepare revisions to the O&M Plan during this reporting period.

3.11 COMMUNICATION AND COORDINATION INTERACTIONS

1. This section describes the types of interactions that occurred with project stakeholders during the performance of the O&M activities in this reporting period. The key Site stakeholders are:
   - Regulatory Agencies (EPA and DTSC)
   - On-Site Owners and Tenants
   - St. Paul High School
   - Adjacent Residential Neighborhood
   - Adjacent Industrial/Commercial Neighbors
   - City of Santa Fe Springs
   - Land Developers/New Owners

2. The following is a summary of the key interactions between the OM&M Supervising Contractor and/or the WDIG Project Coordinator and the key stakeholders during this reporting period:
   - OM&M Supervising Contractor notification/coordination of on-site owners and tenants regarding planned third and fourth quarter OM&M events.
   - St. Paul High School contacts with OM&M Supervising Contractor regarding schedule of events, landscape and site appearance.

- WDIG Project Coordinator contacts with potential land developers/new owners and the City of Santa Fe Springs regarding site conditions and issues.
- WDIG Project Coordinator notification of Regulatory Agencies regarding planned third and fourth quarter OM&M events and other site related activities and issues.
- WDIG Project Coordinator notification/coordination with owners/tenants regarding Institutional Controls Monitoring and Enforcement Work Plan (ICMEWP) checklist inspections.

4.0 SUMMARY OF MONITORING AND SAMPLING ACTIVITIES

4.1 GAS MIGRATION CONTROL SYSTEM

4.1.1 RESERVOIR GAS COLLECTION SYSTEM

1. Monitoring and sampling of the Reservoir Gas Collection System at the WDI Site was performed as part of the overall long-term monitoring plan as described in the OMMP. The location of the Reservoir Gas Collection System is shown in Figures 2-3 and 2-4. Vapor samples were collected monthly during this monitoring period from the carbon vessel inlet (Reservoir Gas Collection System blower outlet) and carbon vessel outlet ports according to the procedures outlined in the Sampling and Analysis Plan (SAP), the SOPs in the Quality Assurance Project Plan (QAPP), and as described below. The QAPP and SAP are also included in the OMMP.

2. During monthly monitoring and sampling of the Reservoir Gas Collection System, air samples were collected in Summa canisters (one each at the carbon vessel inlet and outlet). All samples were transported under Chain-of-Custody to a State of California certified laboratory (Columbia Analytical Laboratories) and analyzed for VOCs, methane, Total Gaseous Non-methane Organics (TGNMO) and fixed gases (i.e., nitrogen, oxygen plus argon, carbon dioxide, carbon monoxide and hydrogen) at the end of each round of monitoring.

4.1.1.1 Sample Collection Procedures

1. The following equipment and materials were used during each round of the Reservoir Gas Collection System monitoring :
   - Foxboro TVA-1000 Combination PID/flame ionization detector (FID) and a LANTEC GA 90 Landfill Gas Meter. Serial Numbers for instruments used during monitoring are shown on the Instrument Calibration Checklist sheets included in Appendix A.2;
   - Two six-liter stainless steel Summa canisters per round of sampling. Laboratory Quality Control Certification Sheets are included in Appendix A.11;
   - Two flow regulators per round of sampling, set by the laboratory to collect a 30-minute sample (i.e., average flow rate of approximately 200 milliliters per minute);
   - Pressure/vacuum gauge;
   - Krestal handheld combination thermometer, barometer, anemometer;

- Reservoir Gas Collection System Air Monitoring Data Sheet;
- Daily Field Report;
- Personal protective equipment (PPE) as described in the Final Health and Safety Plan (HASP).

2. The Reservoir Gas Collection System enclosure was visually inspected prior to collection of vapor samples to verify that there were no stored chemicals, cleaners or other fugitive sources of methane or VOC's. No unusual odors or fugitive emission sources were noted during the monthly Reservoir Gas Collection System monitoring.

3. Flow-regulated, six-liter, stainless steel Summa canisters were used to collect air samples during monthly monitoring and sampling. The initial vacuum level was measured in each canister prior to start of sample collection and recorded on the Reservoir Gas Collection System Data Sheet. The flow regulators were then connected to the Summa canisters. Copies of the completed Reservoir Gas Collection Data Sheets for each sampling event are included in Appendix A.2.

4. VOC monitoring from the Reservoir Gas Collection System carbon vessel inlet and outlet sample ports was also performed using the Foxboro TVA-1000 PID/FID. Methane, carbon dioxide and oxygen levels were measured from the sample ports using the LANTEC GA-90. Each instrument was allowed to warm up and was then calibrated using the calibration methods described in the instrument's operating manual. Copies of the instrument calibration records are included in Appendix A.2.

5. VOC, methane, oxygen and carbon dioxide levels were measured by connecting the calibrated field instruments directly to the inlet and outlet sample ports using clean plastic tubing. The readings were recorded on the Reservoir Gas Collection Data Sheet. Clean plastic tubing was also used to connect the flow-regulated Summa canisters to the Reservoir Gas Collection System carbon vessel inlet port and outlet ports. Ambient temperature readings in units of degrees Fahrenheit and barometric pressure readings in units of inches of mercury were measured using a Krestal handheld combination barometer, thermometer and anemometer and recorded on the Reservoir Gas Collection Data Sheet.

6. After recording the ambient conditions, the Summa canister valves were opened. The sampling start time was recorded on the Reservoir Gas Collection Data Sheet. The carbon vessel inlet and outlet vapor samples were collected over a continuous 30-minute period

using the flow regulators. The sampling technician remained at the Reservoir Gas Collection System site during the sample collection period to ensure the security of the Summa canisters.

7. At the completion of the vapor sample collection period, the Summa canister valves were closed, tubing disconnected and the flow regulators removed. A pressure gauge was attached to each Summa canister and the final vacuum level in the Summa canister was measured and recorded. The blower discharge pressure and temperature and ambient pressure and temperature were recorded. Final field instrument readings (i.e., methane, oxygen, carbon dioxide and VOCs) were measured from the carbon vessel inlet and outlet ports and the results recorded on the Reservoir Gas Collection Data Sheet.

8. A label was attached to each Summa canister using the following identification convention:
   - "WDI" (for Waste Disposal, Inc.);
   - An alphabetic code describing the Reservoir Gas Collection System Monitoring location;
   - An additional identifier corresponding to the sampling round being performed.

   The sample identifier is illustrated below:

   WDI-GTS-IN-9-26-07 (Reservoir Gas Collection System Carbon Vessel Inlet, Monthly Sample Collected on September 26, 2007.)

9. Each Summa canister was logged on a Chain-of-Custody form and placed in a cardboard container. The cardboard container was sealed with tamper proof tape and transported to Columbia Analytical Laboratories for analysis.

10. The Reservoir Gas Collection System monitoring and QA/QC results are presented in Chapters 5.0 and 6.0, respectively, and Conclusions and Recommendations are presented in Chapter 8.0.

4.1.2 BUILDING MODIFICATIONS

1. In-business air monitoring in 14 commercial buildings surrounding the WDI Site was performed quarterly at 10 locations and once at 4 additional locations. The locations of the 14 businesses where samples were collected are shown in Figure 2-4. Air samples were collected from each of the in-business monitoring locations according to the procedures

outlined in the SAP, the SOPs in the QAPP and as described below. The frequency of monitoring is based on the Decision Matrix for In-Business and Ambient Air Monitoring shown in Figure 4-1. The monitoring frequency is reviewed after each quarterly OM&M event or as described in the decision matrix and may be revised. Revisions to the monitoring frequency if necessary during this reporting period are described below.

2. The Third Quarter in-business air monitoring and sampling event occurred in June 2007, and the Fourth Quarter in-business air monitoring and sampling event occurred in September 2007. Indoor business air samples were taken at the following 10 locations:

- 12635 E. Los Nietos Road (IBM-03);
- 12811 E. Los Nietos Road (IBM-41);
- 9843 S. Greenleaf Avenue (IBM-50);
- 12633 Los Nietos Road (IBM-03B);
- 12637A Los Nietos Road (IBM-24B);
- 12083 Los Nietos Road (IBM-37);
- 9620 Santa Fe Springs Road (IBM-21);
- 9630 Santa Fe Springs Road (IBM-22);
- 9640 Santa Fe Springs Road (IBM-28); and
- 12747 Los Nietos Road (IBM-32).

Ambient air samples were also collected at the following two locations:

- Outside building at 12637 Los Nietos Road (IBM-24AMB);
- Outside at southeast corner of Los Nietos Road and Greenleaf Avenue (IBM-49AMB).

During the Fourth Quarter 2007 sampling event, indoor business air samples were collected from four additional locations due to statistically significant concentration increases in certain constituents in vapor wells VW-49, -58, and -61 pursuant to the Decision Matrix for Soil Gas Monitoring Data (Figure 4-2). As per Figure 4-2, samples were collected at the following four locations:

- 12639 Los Nietos Road (IBM-12);
- 12741 Los Nietos Road (IBM-42);
- 12723 Los Nietos Road (IBM-43); and
- 12715-17 Los Nietos Road (IBM-44).

3. During the Third Quarter monitoring event, 15 air samples, including three duplicate samples, were collected in Summa canisters. During the Fourth Quarter monitoring event, 22 air samples, including six duplicate samples, were collected in Summa canisters. All samples were transported under Chain-of-Custody to a State of California certified

laboratory (Columbia Analytical Laboratories) and analyzed for VOCs by EPA Method TO-15 (including SIM analysis for vinyl chloride and 1,2-dibromoethane), and methane and TGNMO by EPA Method 25C.

4.1.2.1 <u>In-Business Sample Collection Procedures</u>

1. The following equipment and materials were used during each round of in-business and ambient air monitoring:
   - Foxboro TVA-1000 PID/FID, Serial Numbers for instruments used during monitoring are shown on the Instrument Calibration Checklist sheets included in Appendix A.12;
   - Fifteen six-liter stainless steel Summa canisters for Third Quarter sampling and 22 six-liter stainless steel Summa canisters for Fourth Quarter sampling. Laboratory Quality Control Certification Sheets are included in Appendix A.11;
   - Flow Regulators set by the laboratory to collect a 24-hour sample (i.e., average flow rate of approximately 4 milliliters per minute);
   - Stainless steel tee fitting with valve for duplicate sampling;
   - Vacuum pressure gauge;
   - Krestal handheld combination thermometer, barometer, anemometer;
   - Tamper proof tape;
   - In-Business Air and Ambient Air Monitoring Data Sheet;
   - Daily Field Report;
   - PPE as described in the HASP.

2. Coordination with tenants and/or owners occurred for scheduling monitoring activities in each building. Prior to performing any monitoring and sample collection, personnel inspected each building to verify that it was unoccupied and that all doors and windows were closed. A suitable location inside of each target building, away from stored chemicals, cleaners or other sources of VOCs, was selected as the monitoring and sample collection point. The same locations were used for both monitoring events.

3. Flow-regulated, six-liter, stainless steel Summa canisters were used to collect air samples. The initial vacuum pressure was measured in each canister prior to start of sample collection and recorded on the In-Business and Ambient Air Monitoring Data Sheet (In-Business/Ambient Air Data Sheet). Copies of the completed In-Business/Ambient Air

Data Sheets for the sampled locations are included in Appendix A.12. Due to an oversight, in-business/ambient air field sheets from the Third Quarter of FY 2006-2007 were misplaced and not included in Appendix A.12.

4. For each sampling location, a summa canister was placed in the selected location inside the building and/or at the ambient air sampling location and ambient temperature and pressure were measured and recorded. Ambient VOC monitoring was also performed using the Foxboro TVA-1000 PID/FID. Prior to using the PID/FID, the instrument was allowed to warm up and was calibrated using the method described in the instrument operating manual. Copies of calibration records are included in Appendix A.12. Ambient temperature readings in units of degrees Fahrenheit and barometric pressure readings in units of inches of mercury were recorded using a Krestal handheld combination barometer, thermometer and anemometer.

5. After recording the ambient conditions (i.e., temperature, pressure, field VOCs), a flow regulator was connected to the Summa canister, the inlet valve was opened and the handle secured with tamper proof tape. The start time was recorded on the In-Business/Ambient Air Data Sheet. Air samples were collected over a continuous 24-hour period using the flow regulators.

6. Duplicate air samples were collected in Summa canisters as indicated in the QAPP. Duplicate sampling involved placing two flow-regulated Summa canisters next to each other at the sampling location, connecting them with the stainless steel tee fitting, opening the Summa canister valves and then opening the tee valve. During the Third Quarter sampling, three duplicate samples were collected at locations IBM-21, IBM-24B, and IBM-32. During the Fourth Quarter sampling, six duplicate samples were collected at locations IBM-03, IBM-12, IBM-21, IBM-24B, IBM-43, and IBM-49(AMB).

7. At the end of the sampling period, the ambient temperature and pressure and field VOC measurements at the sample location were recorded. The tamper proof tape on the Summa canister valve was inspected, the condition noted and the tape was removed. The Summa canister valve was closed and the flow regulator was removed. A pressure gauge was connected to the Summa canister and the final vacuum level was measured and recorded. For the duplicate samples the same procedure was followed with the sampling tee being removed prior to the flow regulator being removed. The ambient conditions, tamper proof

tape condition, sample collection stop time and the final Summa canister vacuum level were recorded on the In-Business/Ambient Air Data Sheet.

8. A label was attached to each Summa canister using the following identification convention:
   - "WDI" (for Waste Disposal, Inc.);
   - An alpha-numerical code describing the in-business monitoring location;
   - An additional identifier corresponding to the sampling round being performed.

   The sample identifier is illustrated below:

   WDI-IBM-41-9-16-07 (In-business monitoring of Parcel 41, sample collected on September 16, 2007).

9. Each Summa canister was logged on a chain-of-custody form and placed in a cardboard container. The cardboard container was sealed with tamper proof tape and transported to Columbia Analytical Laboratories for analysis.

10. The in-business and ambient air monitoring and QA/QC results are presented in Chapters 5.0 and 6.0, respectively, and Conclusions and Recommendations are presented in Chapter 8.0.

4.1.3 SENTINEL BIOVENT SYSTEM

1. As stated in the Compliance Testing Plan (TRC, 2005a), the Sentinel Biovent System is a secondary Gas Control System for the Site. There are no specific performance goals for the system. As such, the biovent wells do not have data quality objectives for compliance monitoring. Also, the wells are not constructed as monitoring systems and are not configured to be sampled. During this monitoring period, an inspection of the biovent wells was conducted. Results from the inspection are presented in Section 3.2.3 and the inspection sheets are included in Appendix A.4.

2. After completion of the first year OM&M and review of the results for the vapor monitoring wells and in-business air monitoring locations, it has been proposed to EPA to close the biovent wells. The monitoring results indicate the subsurface has become aerobic, which may be supporting some soil gas migration. As noted previously, the

Reservoir Gas Collection System has already been converted to passive mode and the closing of the biovent wells will further reduce air infiltration to the subsurface.

4.2 LEACHATE MONITORING/CONTROL SYSTEM

4.2.1 LEACHATE COLLECTION WELLS

1. Sounding and bailing of the Leachate Collection Wells at the WDI Site was conducted during this monitoring period. The location of the Leachate Collection wells, LC-1, LC-2, LC-3 and LC-4, is shown in Figure 2-3. Monitoring and bailing activities were performed (with some deviations) according to the procedures outlined in the SAP, the SOPs in the QAPP and as described below. Deviations from the SOPs are described below along with the rationale for the changes. Routine monitoring and bailing events were conducted twice weekly and have continued since the end of the Compliance Testing period through September 2007. In November 2007, sounding and bailing of the wells was temporarily discontinued in order to construct automatic recovery systems for wells LC-2 and LC-4. These automatic recovery systems were started in December 2007, at which time sounding and bailing of wells LC-1 and LC-3 was restarted.

4.2.2 SOUNDING AND BAILING PROCEDURES

1. The following equipment and materials were used during the Leachate Collection well sounding and bailing events:
   - Herron water interface meter;
   - 2-inch diameter, 36-inch long PVC Bailers;
   - Bailer Cord;
   - 55-gallon steel drums with lids;
   - PPE as described in the HASP;
   - Daily Field Report forms and/or appropriate monitoring data sheets;
   - Timepiece;
   - Pen with indelible ink.

2. Each well was sounded by first removing the well box cover and well cap. The interface meter was then lowered into the well until the buzzer on the sensor spool activated indicating that the sensor end had encountered liquid. The sounder cable was pulled up slightly and liquids that may have accumulated on the level sensor end as it moved down the well casing were shaken off. The sensor was lowered again to the liquid level. The sensor was raised and lowered several times into and out of the liquid to confirm an

accurate reading of liquid level (+/- 0.01 foot). Once the liquid level had been established with the sounder, the reading on the interface meter tape at the top of the well casing was noted as the depth to liquid. The reading was recorded on the Leachate Collection Monitoring Data Sheet. The Leachate Collection Monitoring Data Sheets are included in Appendix A.8.

3. After measuring the depth to liquid, the interface meter sensor was lowered to the bottom of the well to sound total well depth. The sensor was lowered until it was felt to hit the bottom of the well (i.e., tension on the line was reduced). To assure that the sensor or cable were not caught inside the well and actually at the bottom, the cable was shaken and pulled up and lowered several times. When the sounder could not be lowered deeper into the well it was assumed to be at the bottom. The tape was pulled up until tension could just be felt and the reading on the interface meter tape at the top of the well casing was recorded as the total depth of the well on the Leachate Collection Monitoring Data Sheet.

4. As required by SOP in the QAPP, a well that contained more than 12 inches of liquid was bailed until the level was less than 12 inches. Liquids were removed from the wells by bailing using a 2-inch diameter by 36-inch long PVC bailer. The liquids from the four wells were collected in 55-gallon steel drums. Bailing time and initial and final liquid levels were recorded on the Leachate Collection Monitoring Data Sheet.

5. The bailed liquids were placed in 55-gallon drums. The frequency of sounding and bailing was two times per week. This frequency was maintained since the end of the Compliance Testing period through September 2007 (except when adverse weather conditions prevented access to the Site). Bailing of the wells that contained more than 12 inches of liquid was performed during each monitoring event. The regular, twice-weekly bailing and sounding readings were recorded on Leachate Collection Monitoring Data Sheets.

6. The Leachate Collection Wells monitoring results are presented in Chapter 5.0, and Conclusions and Recommendations are presented in Chapter 8.0.

4.2.3 DEVIATIONS FROM THE SOP

1. SOPs in the QAPP, developed prior to remedy design, directed that all equipment should be decontaminated between well sounding and bailing. Decontamination of equipment between leachate well sounding and bailing was not performed because cross-

contamination is not a concern and sampling is not performed. The liquids in the basin are known to be significantly impacted with petroleum hydrocarbons and the levels and distinction of contaminants between wells is not important.

2. SOPs in the QAPP, developed prior to remedy design, directed that liquids removed from the wells would be accumulated in a Baker tank. However, 55-gallon drums were used as an alternative means of storage.

3. SOPs in the QAPP, developed prior to remedy design, directed that liquids removed from the wells would be placed in the oil/water separator for treatment. Liquids removed from the wells were not treated in an oil/water separator. The collected liquids were profiled and transported to an approved facility beginning in the First Quarter of FY 2007-2008.

4.3 SOIL GAS MONITORING

4.3.1 VAPOR MONITORING WELLS

1. Monitoring and sampling of the vapor monitoring wells at the WDI Site was conducted quarterly during this monitoring period. The locations of the vapor wells are shown in Figures 2-3 and 2-4. Soil gas samples were collected from the vapor well sample ports according to the procedures outlined in the SAP, the SOPs in the QAPP and as described below. The frequency of monitoring is based on the Decision Matrix Criteria for Soil Gas Monitoring Data shown in Figure 4-2 taken from the OMMP. Based on the monitoring results from this and the prior period, the monitoring frequency will be switched from quarterly to semi-annually (First and Third Quarters) starting in the First Quarter of FY 2007-2008 (December 2007).

2. The vapor well locations shown in Figures 2-3 and 2-4 are nested wells with screened intervals at different depths (shallow, intermediate and/or deep). There are 22 vapor well locations shown in Figures 2-3 and 2-4. Two of these wells (VW-32 and VW-33) were not sampled because they were destroyed during construction or paved over. The exact locations of these wells could not be verified and the conditions of the wellheads are not known. The remaining 20 vapor well locations contain a total of 50 nested wells.

3. Vapor wells VW-29 through -39, -41, and -42 are located along the perimeter of the Site and are used to monitor migration of soil vapors offsite as well as towards nearby buildings. These vapor wells are designated "Compliance Vapor Wells" as indicated in Figure 2-4.

4. Vapor wells VW-25, -46, -49, -51, -55, -56, -58, -61, and -62 are located in or near historic areas of non-compliance. These wells were selected to monitor for occurrence and/or migration from these non-compliance areas and are not used to determine compliance with Soil Gas Performance Standards; and therefore, are designated as "Non-Compliance Vapor Wells" as indicated in Figure 2-4.

5. Vapor well monitoring and sampling was conducted in June 2007 (Third Quarter) and September 2007 (Fourth Quarter) during this monitoring period. During the Third Quarter event, three trip blanks and two ambient air samples (VW-35-Ambient and VW-62-Ambient) were collected (one ambient sample collected at the wellhead of a compliance well and one ambient sample collected at the wellhead of a non-compliance well). During the Fourth Quarter event, two ambient air samples (one next to compliance well VW-42 [VW-42-Ambient] and one next to non-compliance well VW-62 [VW-62-Ambient]) were collected but no trip blanks were collected. Trip blanks are required pursuant to the QAPP and this oversight was corrected during the First Quarter FY 2007- 2008 vapor well sampling event.

6. During the vapor well monitoring, a vapor sample was collected in a Summa canister from each nested well installed in the vapor well location. All samples, including the confirmation samples, were transported under Chain-of-Custody to a State of California certified laboratory (Columbia Analytical Laboratories) and analyzed for VOCs by EPA Method
TO-15, methane and TGNMO by EPA Method 25C, and fixed gases (i.e., nitrogen, oxygen plus argon, carbon dioxide, carbon monoxide and hydrogen) by EPA Method 3C. If TGNMO concentrations were elevated, methane was analyzed by EPA Method 3C rather than EPA Method 25C.

4.3.2 VAPOR WELL SAMPLE COLLECTION PROCEDURES

1. The following equipment and materials were used during the vapor well monitoring:
   - Foxboro TVA-1000 Combination PID/FID or equivalent;
   - LANDTEC GA-90 Landfill Gas Meter;
   - Dwyer 475 Mark III Handheld Digital Manometer with appropriate pressure ranges for the wells to be monitored;

- Thomas vacuum pump (Model 107 COC 18-TFE);
- Krestal handheld combination barometer, thermometer and anemometer;
- Timepiece;
- Pen with indelible ink;
- 6-liter Summa canisters;
- Flow regulators, set by the laboratory to collect a 30-minute sample (i.e., average flow rate of approximately 200 ml/min);
- Thermometer inserted through a center drilled stainless steel tee;
- Generator;
- Vapor well monitoring data sheets;
- Vacuum pressure gauge;
- 1 to 10 liters per minute flow meter;
- Various 1/4- and 1/2-inch-diameter Tygon® tubing lengths and wye-splitter fittings;
- PPE as described in the HASP;
- Soil Vapor Well Monitoring Data Sheet.

2. The area around the vapor wells was inspected prior to collection of samples to verify stored chemicals, cleaners or other potential sources of VOCs were not present. Also, the gas powered electrical generator powering the vacuum pump was kept down wind of the wells during sampling.

3. The initial pressure/vacuum and soil gas conditions in each of the nested well monitoring points were measured. Pressure/vacuum and soil gas readings were measured by attaching the appropriate instrument to the well using a short piece of tubing. Pressure/vacuum readings were collected using a suitable range Dwyer 475 Mark III Handheld Digital Manometer. Vapor well VOC levels were measured using the Foxboro TVA-1000 PID/FID. Vapor well methane, carbon dioxide, and oxygen levels were measured using the LANDTEC GA-90. All readings were recorded on the Soil Vapor Well Monitoring Data Sheet. Both gas analysis instruments were allowed to warm up and were then calibrated using the calibration methods described in the instrument's operating manual. Copies of the instrument calibration records are included in Appendix A.6.

4. Each nested well monitoring point was purged prior to sample collection. Three well volumes of soil gas were withdrawn using the vacuum pump connected with tubing to the

nested well monitoring point. The flow rate was measured using a 10-liter per minute capacity flow meter and the soil gas temperature was measured using a thermometer inserted through a center drilled stainless steel tee. The flow meter and thermometer were installed inline between the nested well monitoring point and the vacuum pump. The volume of air required to purge three well volumes was calculated as described in SOP S. The vacuum pump flow rate, soil gas temperature, purge time and volume were recorded on the Soil Vapor Well Monitoring Data Sheet. Copies of the completed Soil Vapor Well Monitoring Data Sheets for all sampled locations, including the confirmation sample locations, are included in Appendix A.6. Due to an oversight, soil vapor well monitoring data sheets from the Third Quarter of FY 2006-2007 were misplaced and not included in Appendix A.6.

5. After well purging, VOC, methane, carbon dioxide and oxygen readings were measured again using the field instruments and the data recorded. After the post purge readings were collected, the field instruments were disconnected. Prior to connection of the Summa canister to the nested well, the initial vacuum pressure was measured in each canister. A 30-minute flow-regulator was then connected to each Summa canister and one flow-regulated Summa canister was attached to each nested well monitoring point to collect a soil gas sample. All data were recorded on the Soil Vapor Well Monitoring Data Sheet.

6. Ambient temperature readings in units of degrees Fahrenheit and barometric pressure readings in units of inches of mercury were measured using a Krestal handheld combination barometer, thermometer and anemometer and recorded on the Soil Vapor Well Monitoring Data Sheet.

7. After recording the ambient conditions, the Summa canister inlet valves were opened. The start time was recorded on the Soil Vapor Well Monitoring Data Sheet. Duplicate air samples were collected in Summa canisters as indicated in the QAPP. Duplicate samples were collected by connecting two flow-regulated canisters together using a "Y" manifold made from a Nalgene wye and Tygon tubing. After connecting the two canisters the third connection of the manifold was connected to the nested well monitoring point. Both canister valves were opened simultaneously to obtain a split sample. Air samples were collected over a continuous 30-minute period using the flow regulators. The technician remained at the vapor well during the 30-minute sample collection period to ensure the security of the Summa canisters.

8. Unusual odors or fugitive emission source were not noted during the vapor well monitoring events.

9. After the completion of the 30-minute monitoring period, the Summa canister valve was closed and the flow regulator was removed. A pressure gauge was attached and the final vacuum pressure in each Summa canister was measured. The sample collection stop times and the final vacuum pressures were recorded on the Soil Vapor Well Monitoring Data Sheet.

10. A label was attached to each Summa canister using the following identification convention:
    - "WDI" (for Waste Disposal, Inc.);
    - An alpha-numeric code describing the vapor well monitoring location and depth;
    - An additional identifier corresponding to the sampling round (date) being performed.

    The sample identifier is illustrated below:

    WDI-VW-41-S-9-18-07 (Vapor Well 41, shallow monitoring point collected on September 18, 2007).

11. Each Summa canister was logged on a Chain-of-Custody form and placed in a cardboard container. The cardboard container was sealed with tamper proof tape and transported to Columbia Analytical Laboratories for analysis.

12. The vapor well air monitoring and QA/QC results are presented in Chapters 5.0 and 6.0, respectively, and Conclusions and Recommendations are presented in Chapter 8.0.

4.4 GROUND WATER MONITORING

4.4.1 GROUND WATER MONITORING WELLS

1. Monitoring and sampling of the ground water wells at the WDI Site was conducted once during this reporting period. The locations of the 12 ground water wells are shown in Figures 2-3 and 2-4. Ground water samples were collected from the wells according to the procedures outlined in the SAP, the SOPs in the QAPP and as described below. The frequency of monitoring is based on the Decision Matrix Criteria for Ground Water

Monitoring shown in Figure 4-3. Based on the monitoring results from this and the prior period, the monitoring frequency will be switched from semi-annual to annual (First Quarter) starting in the First Quarter of FY 2007-2008.

2. Ground water monitoring and sampling was conducted in June 2007 (Third Quarter) during this monitoring period and was conducted on a semi-annual basis during the first year of operation (First Quarter and Third Quarter). During the Third Quarter event, 12 ground water samples along with two trip blanks, two field blanks, and two equipment rinseate blanks (one of each per day of sampling) and two duplicate samples (from GW-11 and GW-30) were collected.

3. The 12 ground water wells are divided into four groups; Background Wells, Point of Compliance (POC) Wells, Near-Source Detection Wells and Verification Wells. Background wells are onsite wells that have not been impacted by Site activities (typically they are located upgradient or cross-gradient on the Site). The selected background wells include GW-01, -02 and -32. In addition, well GW-11 was also monitored for deep background cross-gradient ground water quality.

4. POC wells are onsite monitoring wells located at the POC (i.e., downgradient edge of the waste unit). The selected POC wells include ground water wells GW-22, -23, and -26.

5. Near-Source Detection Wells are onsite detection wells located near the waste source area. Wells GW-10 and -33 are selected as near-source detection wells for long-term ground water monitoring.

6. The Verification Wells are onsite wells located near the property line of the Site downgradient of the Site waste source. The existing downgradient monitoring wells GW-27, -29, and -30 serve as verification wells for long-term ground water monitoring.

7. Ground water monitoring wells were sounded to determine liquid levels. The ground water samples were transported under Chain-of-Custody to a State of California certified laboratory (TestAmerica Analytical Laboratories) and analyzed for VOCs by EPA Method 8260B, chlorides and sulfates by EPA Method 300.0, total dissolved solids by EPA Method 160.1, pH by EPA Method SM4500-H,B, SVOCs by EPA Method 8270C and total dissolved metals by EPA Methods 6010 and 7470. Table 4-1 lists the COCs for which ground water is analyzed along with the corresponding MCLs for drinking water. As noted

in Chapter 2.0, the AROD (EPA, 2002) concluded that the Site has not impacted ground water.

4.4.2 GROUND WATER MONITORING AND SAMPLE COLLECTION PROCEDURES

4.4.2.1 Ground Water Well Monitoring and Sample Collection Equipment

1. The following materials were used for this procedure:
   - Solinst water level meter with 200 feet of sounding line and a Type P.4 probe (or similar).
   - One 9-volt alkaline battery for power backup.
   - One-half-inch inside diameter vinyl tubing in 100-foot lengths.
   - Centrifugal, submersible, peristaltic pump or bailer for purging and sample collection.
   - pH and temperature meter.
   - Specific conductance meter.
   - Bailers.
   - Sample containers (provided by analytical laboratory, with appropriate preservatives as outlined in the QAPP).
   - Buckets and intermediate containers.
   - Coolers and ice.
   - Bailer cord.
   - Disposable (Nitrile) gloves.
   - Chemical-free paper towels.
   - Plastic sheets.
   - Sample bottle labels.
   - Daily Field Report forms and/or appropriate monitoring data sheets (see SOP J).
   - Ground Water Sampling Field Notes
   - Timepiece.
   - Pen with indelible ink.

4.4.2.2 Ground Water Well Sounding Procedures

1. Well sounding was conducted using a Solinst water level meter or similar device.

2. To sound the monitoring well, the cap on top of the well was removed, and the weighted end of the sounder was lowered into the well. The sounder was lowered until the buzzer on the sounder spool activated ("buzzed"), indicating liquids were at the sounder end. Depth to water (DTW) was measured to the top of the casing at the surveyor's v-notch or otherwise marked location on the top of the casing. The DTW was noted on the monitoring data sheet. The probe was raised above the liquid level and resubmerged two or three times to confirm an accurate reading of liquid level.

3. To sound total well depth, the sounder was lowered until it was felt to hit the bottom of the well (tension on the line reduced). To assure that the sounder was not "hung up" inside the well, the sounder cable was shaken and the sounder was further lowered, if possible. If it was not lowered further, the reading as "total depth" was recorded on the monitoring data sheet.

4. Field equipment was decontaminated between wells. Decontamination procedures are described in SOP G.

4.4.2.3 Ground Water Well Purging Procedures

1. Each well was purged prior to sample collection by withdrawing three well volumes of ground water. The volume of water present in each well was computed based on the length of the water column and the well casing diameter.

2. Water was purged from the bottom of the well screen interval. At the start of purging and after every well volume withdrawn, the temperature, conductivity, and pH (indicator parameters) of the purge water were measured. Samples were collected after the removal of three well volumes and when the value of indicator parameters did not vary by more than 10 percent over two consecutive measurements. As described in the QAPP and the SOP, these instruments were calibrated daily to maintain accuracy. Field parameter values were recorded on the Ground Water Monitoring Data Sheet, along with the corresponding purge volume. If the well was purged dry, samples were collected after the well returned to 80 percent of its original volume but not to exceed 2 hours.

3. A low flow sampling pump was used, in accordance with EPA guidance for ground water sampling of metals and general parameters.

4.4.2.4 Ground Water Well Sample Collection Procedures

1. Samples were collected using a clean, decontaminated Teflon®, stainless steel, or disposable bailer and a spool of new, clean polypropylene rope, or equivalent bailer cord. The bailer was fitted with a petcock valve or volatile organic analysis (VOA) tip to facilitate controlled filling of sample containers.

2. The bailer was lowered into the monitoring well and water samples were obtained from midpoint or lower within the water column; this was accomplished by lowering the bailer to the midpoint or lower before retrieving it from the well.

3. When removing the sample from the bailer to the sample bottle, the mixing of air was minimized by tilting the sample bottle and allowing the water to run down the inside wall of the bottle.

4. When sampling for VOCs, the 40-milliliter VOAs were completely filled with no remaining headspace. To avoid aeration, the VOA was held at an angle so that the stream of water flowed down the side.

5. The VOA was turned upside-down and tapped to check for air bubbles. If bubbles were present, the VOA was disposed of, and a new VOA filled.

6. Dissolved metal samples were field filtered by attaching a disposable, 0.45 micrometer filter to the discharge tubing upon the completion of well purging.

7. Plastic bottles without preservatives were completely filled to minimize air contact; however, 1-liter glass bottles were filled 90 percent full to allow room for expansion and contraction of liquid.

8. Each sample collected was identified as having originated from the site by prefacing each sample designation with "WDI" (for Waste Disposal, Inc.), identified by an alpha and numerical code for the well, and having an additional identifier corresponded to the ground water sampling round (date) being performed. The sample identifier is illustrated below:
    - **WDI-GMW-32-6-28-07** Ground Water Monitoring Well No. 32, collected on June 28, 2007.

9. Information on analytical parameters, sample containers, methods of preservation, and holding times are specified in the QAPP.

10. Samples were packed in the following manner for shipment. Detailed transportation procedures are provided in SOP H.

    - Each sample container was wrapped in bubble pack or other packing material, placed in separate, sealable plastic bags, and then placed in an ice chest precooled to 4 degrees Celsius (°C) with Blue Ice® packages or double-bagged ice packets.
    - The completed Chain-of-Custody record going to the laboratory was placed in a sealable plastic bag, which was placed in the cooler.
    - The cooler lid was taped shut with strapping/packaging tape.
    - A custody seal was completed, signed and attached to the lid and the front of the cooler for hinged coolers. Two custody seals were attached to coolers with removable lids. One was attached to the front and one to the back of these coolers.
    - The coolers were hand-delivered or shipped via overnight carrier to the laboratory at the end of each day's sampling. Samples were shipped in a manner such that the laboratory received them within 24 hours or less from the actual sampling times, depending on the holding times.

11. The pumps used for purging and sampling of metals and general parameters were decontaminated after each use following procedures provided in SOP G.

12. Each sample container was labeled with the name of the person taking the sample, date and time, identification code, type of sample, preservation method, and analyses to be performed. The label also indicated if the sample was to be held in appropriate storage by the laboratory until the geologist/engineer determined if analyses was to be performed based on initial analytical results for representative samples.

13. Sample documentation was performed in accordance with the procedures in the SAP and SOP J and monitoring and measurement data was recorded on the appropriate monitoring data sheet. The data sheets are included in Appendix A.5.

14. Chain-of-Custody procedures which are provided in SOP I and discussed in the QAPP were used to maintain and document sample possessions. The Chain-of-Custody record was initiated at the time of sampling and contained the sample number, date and time,

name and dated signature of the person taking the sample, as well as the methods by which each sample was to be analyzed, and other pertinent information.

15. Sample transfers were noted on the record sheet for each sample. Standardized Chain-of-Custody forms were used for tracking samples from the point of origin in the field through laboratory processing and disposal.

16. The Chain-of-Custody forms accompanied the samples, enclosed within the ice chest. One copy of each form was retained by field personnel prior to shipment of the samples to the laboratory. Copies of the Chain-of-Custody records completed by the laboratory were returned with the results of laboratory analyses.

17. The ground water well monitoring and QA/QC results are presented in Chapters 5.0 and 6.0, respectively, and Conclusions and Recommendations are presented in Chapter 8.0.

4.5 STORMWATER MONITORING

1. The Long-Term Stormwater Monitoring Plan involves monitoring of stormwater runoff quality and volume and inspection and maintenance of the stormwater drainage system at the Site.

2. A SWPPP is not required since there are no known sources of potential surface pollutants to stormwater runoff from the Site area. Also, there have been no significant quantities of spills, leaks, treatments, or storage of known materials at the Site since the Site has been closed as a waste disposal facility in the mid to late 1960s. The fill soils comprising the RCRA C-equivalent and RCRA D-equivalent caps have been demonstrated to not be contaminated.

4.5.1 OBJECTIVES AND REQUIREMENTS

1. The objectives of the Long-Term Stormwater Monitoring Plan is to control and monitor stormwater runoff quality to determine effectiveness of the RCRA Subtitle C- and D-equivalent covers and implemented surface drainage control systems (i.e., stormwater management system), and potential degradation of stormwater quality due to tenant-related activities and/or migration of buried wastes.

2. There are no Long-Term Stormwater Monitoring Plan requirements or Performance Standards identified in the CD. The Long-Term Stormwater Monitoring Plan is designed based on the stormwater runoff quality monitoring requirements identified herein.

4.5.2 STORMWATER MONITORING PARAMETERS

1. The stormwater runoff quality monitoring parameters include the COCs identified for the Long-Term Ground Water Monitoring Plan. The stormwater is monitored for ground water COCs in order to detect potential migration of contaminants from buried Site waste material. The stormwater COCs also include contaminants related to onsite activities (due to business conducted by the tenants of the onsite buildings). This provides information on possible contamination and environmental impacts caused by the tenant activities at the Site. The contaminants related to tenant onsite activities include oil and grease, metals, and total suspended solids (TSS). Table 4-2 lists the COCs for which stormwater is analyzed along with the corresponding MCLs for drinking water.

2. The stormwater runoff volume will also be monitored to verify the implemented surface drainage system meets the design requirements. The key design requirements identified for the Site surface drainage control system are as follows:
   - Prevent erosion of containment structure.
   - Design system for 100-year, 24-hour storm.
   - Integrate with existing offsite infrastructure.
   - Final grade to promote lateral drainage and prevent ponding due to future settlement.
   - Final grade to consider post-closure land use.

4.5.3 STORMWATER MONITORING PROGRAM

1. The proposed stormwater monitoring program includes monitoring of stormwater runoff quality and visual inspection of surface drainage control systems implemented at the Site (post construction).

2. The stormwater monitoring sampling locations, SW-1 through SW-6, are shown in Figure 2-5. The selected locations are the surface drainage catch basin (SW-2), which is located at the low spot of the Site to collect stormwater runoff and convey the collected

water to the stormwater sewer system, and the locations within stormwater drainage paths (SW-3 through SW-6). Note that the sampling point SW-1 is not located within the catch basin area or drainage paths; instead the SW-1 location is the highest point (highest elevation) at the Site. The analytical results of the sample collected at SW-1 will provide "background concentrations" of rainfall precipitation before it has significant Site surface contact and is conveyed to a runoff point. Stormwater samples will be collected and analyzed pursuant to the procedures and methods described in the QAPP and associated SOPs.

4.5.4 STORMWATER MONITORING FREQUENCY

1. The stormwater sampling and drainage system inspection will be conducted following the first significant storm event after construction of the Site remedies is completed and again after a second significant storm event. A significant storm event is one that has accumulated precipitation at the Site greater than 2 inches over a 24-hour period. Additional monitoring events may be performed as needed or at the direction of EPA.

4.5.5 STORMWATER MONITORING

1. Based on the stormwater monitoring requirements and frequency, sampling was not conducted during this or the prior reporting period due to minimal rainfall events and intensities. At this point in time, the initial and second significant storm events have not occurred that would have required a stormwater monitoring event. Routine inspections of monitoring points and control system features were conducted and are reported in Section 3.4 and Appendix A.7.

4.6 STATISTICAL ANALYSIS OF ANALYTICAL DATA

1. The statistical analysis of the soil gas and ground water analytical data is discussed below. The purpose of the statistical analysis is to compare the post remedy concentrations of soil gas and ground water COCs with concentrations that existed prior to remedy implementation. In this manner, statistically significant concentration changes that occur post-remedy can be identified. This statistical analysis is not intended to identify pre-remedy contamination changes. The constituent data that was measured prior to remedy implementation defines background concentrations for purposes of evaluating statistically significant changes/trends in chemistry post remedy. This approach is consistent with that

discussed in EPA, 1989 in which a background concentration distribution is defined and used to evaluate trends/statistically significant changes in data after the background period.

2. As monitoring continues and the new data are found to be "in control", i.e., within calculated limits, the background period and statistics of mean and variance will be updated to include the new data. The background update will occur every 2 years. This approach is consistent with that discussed in EPA, 1989 and Gibbons et al., 2003. If the data are found to be "out of control" (i.e., the data fall outside calculated limits), the background period will remain constant (i.e., include only data collected pre-remedy or that are "in control").

3. Statistical analysis of the data is performed using the computer program DUMPStat developed by Discerning Systems, Inc. (Gibbons et al., 2003). Specifically, the Shewart-CUSUM control chart method for intra-well comparisons is used to derive the baseline control limit using historical (background) data. Deviations from background/pre-remedy concentrations are determined by comparing the measured concentrations for samples taken post-remedy to the Shewart-CUSUM control limit. The intra-well method is appropriate for soil gas since there is a high degree of spatial variability in the soil gas concentration across the Site. The variability in soil gas concentrations is likely a result of the variability of the waste stream and waste distribution throughout the Site. The intra-well method is appropriate for ground water since ground water quality was not impacted prior to remedy implementation and the well locations are located spatially and vertically (i.e., in multiple water bearing zones) apart from one another. Thus, the data at each well defines the background for the well prior to waste placement and through the time period prior to remedy implementation.

4. A database must have certain characteristics for the control chart method to provide reliable results as discussed in EPA, 1989 and Gibbons et al., 2003. Key characteristics include the following:
   - A minimum of eight sample results. A smaller database results in a high false negative rate.
   - The data are independent and normally distributed. Of these, independence is the most important while normality is less of a concern (EPA, 1989 and Gibbons et al., 2003). Since the sampling history has been random in nature, the data are likely independent.
   - Non-detects should not comprise a significant portion of the database (i.e., should be less than 75 percent of the test results).

For databases with less than 8 sample results or less than 25 percent detects for a given constituent, DUMPStat uses a Poisson prediction limit to evaluate the data. Poisson prediction limit exceedances are not statistically robust like the CUSUM exceedances. Poisson exceedances are useful to track as an indication of potential areas of concern.

5. Considering the requirements discussed above and as agreed with the EPA, evaluating trends using the control chart method is suited to the Non-Compliance Soil Gas and ground water analytical results. Most constituents at the soil gas compliance wells are not frequently detected as shown in Table 4-3. Soil gas results for the compliance wells are compared to the SGPS to assess soil gas migration and potential effects of the remedy on soil gas concentrations. Section 5.3.2 discusses the soil gas compliance well results. The statistical evaluations for the Non-Compliance Soil Gas wells and ground water wells are provided in Sections 5.3.4 and 5.4.2.6, respectively.

6. The database utilized for statistical analysis includes all monitoring results for each constituent at each monitoring location. When a constituent was measured to be non-detect, one-half of the detection limit was used in the database for that sample episode. As is evident in the DUMPStat output, the non-detect values vary over time. This variation is due to laboratory QA/QC methods that result in changes to the detection limit. Method detection limits (MDLs) vary for a number of reasons. The laboratory is required to perform an MDL study at least once annually for each matrix, method, analyte, and instrument. If there are four instruments performing TO-15, for example, the highest MDL for a given analyte is used in the reporting of data. Also, when samples are analyzed, the MDL is adjusted based on the dilution factor. Therefore, if sample 1 has a different dilution factor than sample 2, the MDLs for a given analyte will vary. Appendix B.1 provides further discussion of the cause of detection limit variation.

   In addition, DUMPStat requires the user to specify the value of certain parameters. These include the following along with the specified value:

   h - decision interval value, = 4.5
   k – reference value or allowable slack, = 1
   SCL – upper Shewart Control limit, = 4.5

   These values are within the recommended range and result in a more conservative result (EPA, 1989 and Gibbons et al., 2003).

7. DUMPStat automatically identifies and excludes outliers in computing the statistics of mean and standard deviation. This eliminates extreme values that could bias the statistical limits to the high side (Gibbons et al., 2003).

8. In addition to identifying Normal Control Limit and Poisson Prediction Limit exceedances, DUMPStat also indicates when exceedances are verified, termed "Verified Exceedance" or "Verified Hit" (These terms are used interchangeably by the program based on space limitations in the graph title line). Verified Exceedances and Verified Hits are the terms used to indicate the preceding exceedance of the limits has been verified. If the preceding exceedance is verified by the current point, then the graph title will include "verified exceedance or verified hit".

5.0 MONITORING RESULTS

1. Data provided in this report are based on sampling and monitoring events during the Third and Fourth Quarters of FY 2006-2007 (April 2007 through September 2007). Data collected beyond this timeframe are also presented for the Reservoir Gas Collection system and Leachate Monitoring/Control System as noted in the following sections. The data were collected using the procedures described in Chapter 4.0 and in the OMMP. Data provided for Vapor Monitoring Wells, Building Modifications (in-business air), and Surface Emissions Monitoring (ambient air) were collected quarterly during two sampling events (June 2007 and September 2007). Data for the Reservoir Gas Collection System were collected monthly. Data for the Leachate Monitoring/Control System were collected biweekly during this reporting period. Data for the Ground Water Monitoring Wells were collected semi-annually from one sampling event in June 2007.

5.1 GAS MIGRATION CONTROL SYSTEM

5.1.1 RESERVOIR GAS COLLECTION SYSTEM RESULTS

1. Monthly samples were collected and analyzed from the reservoir gas collection system influent and effluent from April 2007 through September 2007. The analytical results are summarized in Table 5-1 and the laboratory reports and Chain-Of-Custodies are included in Appendix B.2. Table 5-1 also includes data collected through December 2007, at which time the system blower was shut down and the system was switched to passive mode.

2. Methane influent results were low (concentrations ranged from 75 to 1,200 ppmv or approximately 0.2 to 3.5 pounds per day based on the system flow rate of approximately 50 standard cubic feet per minute (scfm) versus the SCAQMD "active" operation performance criteria of 2.3 pounds per day. The average methane rate for this reporting period (April through September 2007) was 0.93 pounds per day; the average methane rate from November 2006 through December 2007 was 0.89 pounds per day. The OMMP "active" versus "passive" operation criterion is 2.3 pounds per day (i.e., the system is to be operated in the active mode if the methane rate is at or above this value). The methane influent results were below the active operation criterion of 2.3 pounds per day with the exception of the result from September 2007 (3.5 pounds per day). Figure 5-1 provides a graph of the methane data in pounds per day versus time. These methane results are not indicative of high anaerobic generation rates in the waste materials. The fixed gases indicate higher nitrogen and carbon dioxide and lower oxygen levels than in typical ambient air (e.g.,

typical ambient air: nitrogen=79 percent, oxygen=21 percent, and carbon dioxide=330 ppmv). The fixed gas results are indicative of aerobic degradation conditions occurring in the waste materials (e.g., oxygen being depleted and carbon dioxide being formed with nitrogen concentrations increasing due to oxygen/carbon dioxide volume changes).

3. The TGNMO inlet levels were low and ranged from 2.1 to 17 ppmv as methane (equivalent to 0.5 ppmv as hexane) versus the system performance requirement of reducing the TGNMO by 98 percent or to less than 20 ppmv as hexane. Figure 5-1 provides a graph of the TGNMO concentration data as hexane versus time. The TGNMO levels indicated only low levels of volatile organics were present in the gases extracted from under the RCRA C-equivalent cover.

4. Most of the specific priority pollutant VOCs were either non-detect or in the low parts per billion by volume (ppbv) range (e.g., chloromethane = 8.8 ppbv, vinyl chloride = 25 ppbv, benzene = 65 ppbv, toluene = 2.3 ppbv, and PCE = 10 ppbv) versus the SCAQMD total VOC emission rate of less than 1 pound per day, which would be equivalent to approximately 34,000 ppbv of a compound with a molecular weight of approximately 150. Figure 5-1 provides a graph of the VOC data in pounds per day versus time.

5.1.2 IN-BUSINESS AIR MONITORING RESULTS (BUILDING MODIFICATIONS)

1. The in-business air monitoring was performed at ten locations around the perimeter of the Site (see Figure 2-4 for in-business air monitoring locations). A total of 13 samples (ten business locations and three duplicates) were collected during the Third Quarter and a total of 19 samples (14 business locations and five duplicates) were collected during the Fourth Quarter. Four additional business locations (IBM-12, IBM-42, IBM-43, and IBM-44) were sampled during the Fourth Quarter due to statistically significant concentration increases in non-compliance vapor wells VW-49, -58, and -61 (see statistical results for the First and Second Quarters of FY 2006-2007 in the Semi-Annual OM&M Report) and the resulting action directed by the Decision Matrix Criteria for Soil Gas Monitoring Data (Figure 4-2). The analytical results are summarized in Table 5-2 along with the historical data from previous in-business air monitoring events. Copies of the In-Business Air Monitoring Data Sheets are included in Appendix A.12 (Third Quarter of FY 2006-2007 only) and copies of analytical reports and Chain-of-Custody forms are included in Appendices B.3 and B.4.

2. The methane results were low for each business location sampled and ranged from 1.4 at IBM-21 to 15 ppmv at IBM-32 versus the IATL standard of maintaining the methane concentration at or below 1.25% by volume or 12,500 ppmv in the building. After the First and Second Quarter FY 2006-2007 monitoring events, it was determined that analysis of fixed gases was not required for in-business samples pursuant to the OMMP, and therefore, these analyses were not performed during this reporting period and will not be performed during future monitoring events. Results for ambient air locations IBM-24[AMB] and IBM-49 [AMB] are also provided in Table 5-2.

3. The TGNMO levels ranged from non-detect to 18 ppmv (IBM-21) in the in-business air locations.

4. The analytical results for four specific VOCs in certain business locations were above the IATLs (i.e., benzene in IBM-21, IBM-22, and IBM-42, TCE in IBM-32, PCE in IBM-37, and toluene in IBM-41 versus the IATLs of 2.0 ppbv benzene, 0.56 ppbv TCE, 10.6 ppbv PCE, and 212 ppbv toluene). The following are samples with constituents that were not detected but which had reporting limits above IATLs:

SAMPLE	DATE	ANALYTE	IATL (ppbv)	RESULT (ppbv)
IBM-21	6/30/07	TCE	0.56	<0.57, <0.60
IBM-37	6/13/07	vinyl chloride	0.25	<1.5
	6/13/07	benzene	2.0	<3.2
	6/13/07	carbon tetrachloride	0.68	<1.6
	6/13/07	1,2-dichloropropane	1.86	<2.2
	6/13/07	TCE	0.56	<1.9
	6/13/07	1,2-dibromoethane	0.06	<0.49
	9/19/07	benzene	2.0	<2.1
	9/19/07	carbon tetrachloride	0.68	<1.1
	9/19/07	TCE	0.56	<1.2
IBM-41	6/10/07	vinyl chloride	0.25	<0.36
	6/10/07	chloroform	3.4	<6.1
	6/10/07	1,2-dichloroethane	3.6	<7.4
IBM-41	6/10/07	benzene	2.0	<9.3
	6/10/07	carbon tetrachloride	0.68	<4.7
	6/10/07	1,2-dichloropropane	1.86	<6.5
	6/10/07	TCE	0.56	<5.5
	6/10/07	1,2-dibromoethane	0.06	<0.12
IBM-44		vinyl chloride	0.25	<0.80
		carbon tetrachlroide	0.68	<0.93
	9/16/07	1,2-dibromoethane	0.06	<0.27

5. The specific in-business air monitoring constituents reported above the IATLs are highlighted in Table 5-2 and discussed further in Chapter 8.0 Conclusions and Recommendations. The other priority pollutant VOCs were either non-detect, in the low ppbv range, and/or below the IATLs for each business location.

6. The benzene concentrations in location IBM-21 that exceeded the IATL of 2.0 ppbv ranged from 92 to 97 ppbv in the Third Quarter FY 2006-2007. The previous maximum benzene concentration in IBM-21 was 1.7 ppbv. A chemical inventory was conducted at Parcel 21 on November 9, 2007 to determine any potential sources of benzene. The current tenant is Chillers Services, an air conditioning and demolition contractor. The inventory results are summarized in Table 5-3 and documented the presence of several products that contained solvent type materials. The inventory also identified two products manufactured by CalWestern Paint that contained benzene. The subsequent Fourth Quarter FY 2006-2007, benzene concentrations in IBM-21 ranged from 0.70 ppbv to 0.74 ppbv. The increase in benzene concentrations in IBM-21 during the Third Quarter 2007 was likely associated with tenant activities. Table 5-3 summarizes findings from chemical inventories conducted at in-business air monitoring locations.

7. QA/QC results for the analytical data are presented in Chapter 6.0. Further comments, explanations, and conclusions regarding the results from in-business air sampling are provided in Chapter 8.0 Conclusions and Recommendations.

5.1.3 AMBIENT AIR MONITORING RESULTS

1. Two ambient air sampling stations are monitored in order to provide a baseline for in-business air monitoring results. The outdoor monitoring stations are located outside of the building at 12637 Los Nietos Road (IBM-24[AMB]) and at the southeast corner of the Site near the intersection of Los Nietos Road and Greenleaf Avenue [IBM-49(AMB)], as shown in Figure 2-4. Two ambient air samples were collected during the Third Quarter (no duplicates) and three were collected during the Fourth Quarter (one duplicate). Ambient air samples were collected concurrently with the in-business air samples. Table 5-2 presents the results of the current sampling along with historical data from previous monitoring events. Copies of the Ambient Air Monitoring Data Sheets are included in Appendix A.12 (Third Quarter of FY 2006-2007 only) and copies of the analytical reports and Chain-of-Custody forms are included in Appendices B.3 and B.4.

2. The methane results were low for each ambient air location and ranged from 1.9 to 2.2 ppmv versus the IATL standard of maintaining the methane concentration at or below 1.25 percent by volume or 12,500 ppmv in the buildings. After the First and Second Quarter FY 2006-2007 monitoring events, it was determined that analysis of fixed gases was not required for in-business or ambient air samples pursuant to the OMMP and, therefore, these analyses were not performed during this reporting period and will not be performed during future monitoring events.

3. The TGNMO levels were non-detect for each ambient air location. The specific priority pollutant VOCs were either non-detect, in the low ppbv range, and/or below the IATLs for each location (e.g., at IBM-49[AMB] benzene = 0.55 ppbv, toluene = 1.8 ppbv, m&p xylenes = 1.1 ppbv, and o-xylene =0.39 ppbv).

4. QA/QC results for the analytical data are presented in Chapter 6.0. Further comments, explanations, and conclusions regarding the results from the Ambient Air Monitoring are presented in Chapter 8.0.

5.1.4 SENTINEL BIOVENT SYSTEM

1. The Sentinel Biovent Well System is a secondary Gas Migration Control System for the WDI Site. Vapor samples were not collected from the biovent wells as their purpose is to provide air for aerobic decomposition/biodegradation.

5.2 LEACHATE MONITORING/CONTROL SYSTEM RESULTS

1. The Leachate Monitoring/Control System consists of four leachate collection points, LC-1, LC-2, LC-3, and LC-4. The leachate collection wells are located within the reservoir area of the Site as shown in Figure 2-3. Table 5-4 and Figure 5-2 show leachate levels measured during monitoring and prior to bailing activities through November 2007. Copies of Leachate Collection Well Monitoring Data Sheets are included in Appendix A.8.

2. The liquid levels in leachate collection well LC-1 were between 1.0 and 5.4 feet above the bottom of the well from April through November 2007. The liquid levels generally ranged between 2 and 3 feet during this monitoring period, although there were slight increases in October and November 2007 where liquid levels increased to 4 to 5 feet.

3. Liquid levels in leachate collection well LC-2 were between 6.1 and 10.8 feet above the bottom of the well from April through November 2007. Liquid levels generally ranged between 8 and 9 feet during this monitoring period with a slight increase in levels ranging between 9 and 11 feet in October and November 2007.

4. Liquid levels in leachate collection well LC-3 were between 0.2 and 1.7 feet above the bottom of the monitoring well from April through December 2007. Liquid levels generally ranged between 0.2 and 1.0 foot during this monitoring period and remained relatively constant.

5. Liquid levels in leachate collection well LC-4 were between 6.5 and 14.2 feet above the bottom of the monitoring well from April through December 2007. Liquid levels generally ranged between 8 and 10 feet above the bottom of the wells.

6. Automated pumping systems were installed on wells LC-2 and LC-4 in December 2007, which replaced bailing activities that were occurring twice a week at these wells. Weekly manual bailing of wells LC-1 and LC-3 will continue.

5.3 SOIL GAS MONITORING SYSTEM

5.3.1 VAPOR WELL MONITORING RESULTS

1. There are 20 vapor monitoring well locations around the WDI Site that are designated for long-term monitoring purposes. Each vapor monitoring well location contains nested wells (i.e., there are multiple screened depths at which the soil vapor can be sampled at each well location). The vapor monitoring well locations are shown in Figures 2-3 and 2-4. The 20 vapor well locations contain 50 nested wells.

2. Table 4-3 summarizes the data from the laboratory analyses of the Vapor Well samples along with available historic data. Vapor Wells designated as "Compliance Vapor Wells" are listed first in the table followed by "Non-Compliance Vapor Wells". The designation of compliance and non-compliance wells is described in Section 4.3.1. Copies of the Soil Vapor Monitoring Data Sheets are included in Appendix A.6 (Third Quarter of FY 2006-2007 only) and copies of the analytical reports and Chain-of-Custody sheets are included in Appendices B.5 and B.6.

3. The results for the Compliance and Non-Compliance Vapor Wells sampled during the third and fourth quarter monitoring events are described below.

5.3.2 COMPLIANCE WELLS (VW-29 TO -39, -41, AND -42)

1. The methane results were typically low for each well location sampled and ranged from non-detect to 3.2 ppmv versus the SGPS of 5 percent (i.e., 50,000 ppmv) at the Site boundary. The exceptions to this was VW-34-S, where methane was measured at 130 ppmv in the Fourth Quarter, and VW-38-D where methane was measured between 410 and 730 ppmv, although these results are significantly lower than the SGPS standard for methane.

2. The fixed gas results (e.g., nitrogen, oxygen, carbon monoxide and carbon dioxide) indicate nitrogen levels close to or above typical ambient air (79 percent nitrogen), oxygen levels close to or below typical ambient air (21 percent oxygen), and carbon dioxide levels above typical ambient air of 330 ppmv. The carbon dioxide concentrations in soil gas ranged between 2,380 and 128,000 ppmv. The exception to this was VW-34-S, where carbon dioxide decreased from approximately 90,000 ppmv in the Third Quarter to non-detect (less than 1,700 ppmv) in the Fourth Quarter. The fixed gas results are indicative of aerobic degradation conditions occurring in the soils (e.g., oxygen being depleted and carbon dioxide being formed). As discussed below, for the non-compliance wells, the concentration trend for oxygen is down and the trend for carbon dioxide is up suggesting the site's subsurface conditions may generally be transitioning from anaerobic to aerobic decomposition. This conversion could have an influence on soil gas migration and thus composition changes in compliance wells.

3. The TGNMO levels were low in each vapor well location and ranged from non-detect to 15 ppmv. There is no SGPS for TGNMO in Compliance Vapor Wells; however, the results are consistent with the low concentrations of the total VOCs.

4. The analytical results for two specific VOCs in certain well locations were above the SGPS (i.e., benzene in VW-29-S, VW-29-I, VW-29-D, VW-31-S, VW-31-D, VW-34-S, VW-34-I, VW-34-D, VW-35-S, VW-35-D, VW-36-S, VW-37-S, VW-37-D, VW-41-S, VW-41-D, VW-42-S, and VW-42-D, and TCE in VW-35-D versus the SGPS of 10 ppbv benzene and 200 ppbv TCE).

5. The following are samples with constituents that were not detected but which had reporting limits above SGPSs:

SAMPLE	DATE	ANALYTE	SGPS (ppbv)	RESULT (ppbv)
VW-30-I	9/26/07	vinyl chloride	10.0	<23
	9/26/07	benzene	10 0	<19
	9/26/07	1,2-dibromoethane	1.0	<7.8
VW-30-D	9/26/07	vinyl chloride	10 0	<48
	9/26/07	chloroform	20.0	<25
	9/26/07	1,2-dichloroethane	20.0	<30
	9/26/07	benzene	10.0	<38
	9/26/07	1,2-dibromoethane	1.0	<16
VW-35-D	6/30/07	1,2-dibromoethane	1.0	<2.1
	9/20/07	1,2-dibromoethane	1.0	<3.0
	9/20/07	1,2-dibromoethane	1.0	<3.3

6. The monitoring constituents reported above the SGPS are highlighted in Table 4-3 and discussed further in Chapter 8.0 Conclusions and Recommendations. The other priority pollutant VOCs were either non-detect, in the low ppbv range, and/or below the SGPS for each constituent.

7. QA/QC results for the analytical data are presented in Chapter 6.0. Further comments, explanations, and conclusions regarding the results from the Compliance Vapor Wells are provided in Chapter 8.0.

5.3.3 NON-COMPLIANCE WELLS (VW-25, -46, -49, -51, -55, -56, -58, -61, AND -62)

1. The methane results were low for each well location sampled and ranged from non-detect to 45,800 ppmv (VW-62-S) versus the SGPS of 5 percent (i.e., 50,000 ppmv) for compliance wells at the Site boundary. In general, it is noted that methane concentrations have decreased significantly and, in some cases, by several orders of magnitude, from concentrations prior to remedy implementation. An exception to this is VW-51-I where methane levels were in the 20 percent to 90 percent range prior to remedy implementation and then dropped to less than a hundred ppmv after implementation but have increased to 34,800 ppmv in the Fourth Quarter.

2. The fixed gas results (e.g., nitrogen, oxygen, carbon monoxide, and carbon dioxide) indicate nitrogen levels above typical ambient air (79 percent nitrogen), oxygen levels below typical ambient air (21 percent oxygen), and carbon dioxide levels above typical ambient air (330 ppmv). The fixed gas results are indicative of aerobic degradation conditions occurring in the soils (e.g., oxygen being depleted and carbon dioxide being formed). The concentration trend for oxygen decreasing and carbon dioxide increasing coupled with a decrease in methane concentration after remedy implementation suggests the site may generally be transitioning from anaerobic to aerobic decomposition. There are cases where oxygen is increasing and carbon dioxide is decreasing (VW-55-D, VW-56-I, VW-56-D, VW-61-S, VW-62-D) but methane is still at low levels. These cases may be indicative of one or more of the following conditions:
   - Petroleum hydrocarbons are being depleted in this zone and less aerobic degradation is occurring.
   - Vapor containing larger amounts of oxygen and less carbon dioxide are migrating into this zone from other locations in which less aerobic degradation is occurring.
   - Greater amounts of air are infiltrating this zone and impacting the composition of the vapor.

3. The TGNMO levels were low in each vapor well location and ranged from non-detect to 650 ppmv (VW-51-I). The results are consistent with the low concentrations of VOCs. The TGNMO concentration increased in VW-51-I (650 ppmv) in the Fourth Quarter, but is consistent with the increase in methane in this same well as shown by historical data.

4. The specific priority pollutant VOC concentrations ranged from non-detect to levels similar to historical maximum concentrations in Non-Compliance Vapor Well locations (e.g., PCE = 620 ppbv in VW-49-I, benzene = 52 ppbv in VW-51-D and 17 ppbv in VW-56-S, acetone =13 ppbv in VW-46-I, 140 ppbv in VW-55-I, 38 ppbv in VW-61-S and 9.0 ppbv in VW-62-I, trichlorofluoromethane = 1,100 ppbv in VW-46-I, and 1,1,1-trichloroethane = 20 ppbv in VW-58-D). Benzene, PCE, carbon disulfide, toluene, chloroform, trichlorofluoromethane, and 1,1,1-trichloroethane remained higher or increased above historical maximum concentrations in some Non-Compliance Vapor Wells during the Third and Fourth Quarter events:
   - Benzene = 62 ppbv in VW-46-S, 71 ppbv in VW-46-I, 69 ppbv in VW-46-D, 30 ppbv in VW-49-S, 12 ppbv in VW-56-D, 18 ppbv in VW-58-I, 14 ppbv in VW-58-D, 43 ppbv in VW-61-S, 38 ppbv in VW-61-D, and 14 ppbv in VW-62-D.

- PCE = 19 ppbv in W-46-S.
- Carbon Disulfide = 79 ppbv in VW-51-I and 20 ppbv in VW-61-D.
- Toluene = 13 ppbv in VW-56-D.
- Chloroform = 17 ppbv in VW-51-D.
- Trichlorofluoromethane = 900 ppbv in VW-46-S.
- 1,1,1-Trichloroethane = 17 ppbv in VW-58-I.
- Acetone = 2,800 ppbv in VW-25-D, 190 ppbv in VW-51-I, and 37 ppbv in VW-61-D.
- 2-Butanone = 56 ppbv in VW-25-D and 220 ppbv in VW-51-I.

There are no SGPSs for VOC constituents in Non-Compliance Wells. These and other results are discussed further in Chapter 8.0 Conclusions and Recommendations. Identification of constituents other than COCs are to assess soil gas characterization at the site.

5. QA/QC results for the analytical data are presented in Chapter 6.0. Further comments, explanations, and conclusions regarding the results from the Non-Compliance Vapor Wells are provided in Chapter 8.0.

5.3.4 STATISTICAL ANALYSIS OF NON-COMPLIANCE VAPOR WELL ANALYTICAL DATA

1. Section 4.6 provides a detailed discussion of the purpose and approach to statistical analysis of the Non-Compliance Vapor Wells. The primary purpose of statistical analysis is to identify statistically significant concentration changes of the 18 soil gas performance standard compounds. Statistically significant changes can be an indicator of important changes occurring in the soil gas following remedy implementation. This section discusses the findings of the statistical analysis for the soil gas data collected during the time period of October 1, 2006 through September 30, 2007. The results of the DumpStat analysis are provided in Appendix C.1.

2. The results presented in Table 5-5 indicate CUSUM control limit exceedances at 8 out of 9 Non-Compliance vapor well locations throughout the reporting period (5 of 9 in the first quarter, 7 of 9 in the second quarter, 6 of 9 in the third quarter and 4 of 9 in the fourth quarter). At the 9 Non-Compliance vapor well locations, a total of 25 nested wells are in place. At 15 of the 25 nested wells, a CUSUM control limit exceedance was identified for

one or more of the soil gas constituents of concern throughout the reporting period (6 of 25 in the first quarter, 12 of 25 in the second quarter, 7 of 25 in the third quarter and 5 of 25 in the fourth quarter). The above results indicate reducing CUSUM exceedances after the Second Quarter of FY 2006-2007.

3. Table 5-5 illustrates there were 32 exceedances of the CUSUM Limit for some of the 18 compounds with a SGPS (Table 2-2) at the 25 nested well locations during the reporting period (a total of 32 exceedances out of a possible 1800 exceedances [25 locations x16 compounds x 4 events]). There were 6, 14, 7, and 5 CUSUM Limit exceedances for some of the compounds in the first, second, third and fourth quarters, respectively. There was one significant upward trend and one significant downward trend. The above results also indicate reducing CUSUM Limit exceedances after the second quarter.

4. The AROD (EPA, 2002) identified 18 compounds for which a SGPS is stated as shown in Table 2-2. CUSUM limit exceedances of a statistical limit were determined for 6 of the 18 compounds at one or more of the nested wells. Benzene exceeded the CUSUM limit in 9 of the 25 nested well locations during the reporting period. Methane exceeded the limit in 4 of the 25 nested wells. Toluene exceeded the limit in 3 of the 25 nested well locations; with the remaining 3 compounds exceeding the CUSUM limit at 2 or fewer nested well locations.

5. The limit exceedances, suggest that the changes in constituent concentration may be associated with a change in the soil gas generation/decomposition process. If a gradual change in concentration were occurring, upward trends should have been identified in addition to limit exceedances. Section 8.3 discusses the possibility that the soil gas generation process may be transitioning from the slow anaerobic decomposition process that was present prior to remedy implementation to the more rapid aerobic decomposition process throughout the reporting period. This change in degradation process may be causing a change in soil gas migration and soil gas constituent concentration.

5.4 GROUND WATER MONITORING SYSTEM

5.4.1 GROUND WATER MONITORING PROGRAM

1. The Long-Term Ground Water Monitoring Plan includes monitoring of field parameters (listed in ground water monitoring data sheet), and ground water sampling and analysis of

COCs identified in the AROD. The Site COCs are listed in Table 4-1 along with the corresponding MCLs for drinking water. As noted in Chapter 2.0, the AROD (EPA, 2002) concluded that the Site has not contributed to exceedances of ground water.

2. The results of the ground water analyses are included in Table 5-6 along with historical results. Depth to ground water measurements and ground water elevations are included in Table 5-7. The results above MCLs in Table 5-6 are highlighted for information and comparison purposes only. Ground water elevations from both shallow-screened wells and deeper-screened wells are shown on Figures 5-3 and 5-4. Copies of the laboratory reports and Chain-of-Custody sheets are included in Appendix D.

3. In accordance with Title 22 California Code of Regulations (CCR) §66265.97, the ground water detection monitoring program includes background wells, POC wells, and other wells suitable for early detection of a release from a waste unit (e.g., Near Source Detection Wells and Verification Wells). Twelve wells were selected for the proposed ground water monitoring at the Site based on ground water conditions, flow, and distribution of contaminant sources. The locations of selected long-term ground water monitoring wells are shown in Figures 2-3 and 2-4.

5.4.2 GROUND WATER MONITORING RESULTS

5.4.2.1 Background Wells

1. Background wells are onsite or offsite wells that have not been impacted by Site activities (typically they are located upgradient or cross-gradient of the Site). The background wells are screened within the uppermost aquifer to monitor and document onsite-impacted ground water quality. The selected background wells for the Long-Term Ground Water Monitoring Plan include wells GW-01, -02 and -32. In addition, well GW-11 was also monitored for deep background cross-gradient ground water quality. The locations of background wells are shown in Figures 2-3 and 2-4. These wells are also situated such that they will continue to monitor contaminants derived from offsite upgradient sources.

2. Arsenic and manganese were not detected in the background wells during the monitoring event in June 2007. Previous manganese concentrations detected in GW-11 and GW-32 have been shown to be consistent with regional ground water quality. Lead was detected below the MCL (0.015 mg/L) in GW-2 (0.0055 mg/L) and GW-32 (0.0052 mg/L) and was not detected in GW-01 or GW-11. Mercury was detected below the MCL (0.002 mg/L) in

MW-02 (0.00057 mg/L) and was not detected in GW-01, GW-11, or GW-32. Previous manganese concentrations have been shown to be consistent with regional ground water quality.

3. Except as discussed below, VOCs were not detected in background wells GW-01, GW-02, GW-11, or GW-32. The VOC constituents PCE and TCE have been detected previously in GW-11 but as noted in Chapters 2.0 and 4.0, these VOCs are believed to be from upgradient sources and are not associated with the Site.

5.4.2.2 Points of Compliance Wells

1. POC wells are onsite monitoring wells located at the POC (i.e., downgradient edge of the waste unit). The POC wells are screened within the uppermost aquifer to monitor and detect potential releases and impacts to ground water from site-related waste sources. Based on hydrogeologic conditions at the Site, shallow aquifer POC wells, approximately 200 feet apart, were selected for long-term detection monitoring. The selected POC wells include ground water wells GW-22, -23, and -26.

2. Lead was detected below the MCL (0.015 mg/L) in GW-22 (0.0056 mg/L) and GW-23 (0.0056 mg/L) and was not detected in GW-26. Mercury was detected below the MCL (0.002 mg/L) in GW-22 (0.00043 mg/L) and GW-26 (0.00026 mg/L) and was not detected in GW-23. Arsenic and manganese were not detected in the POC wells. Previous manganese concentrations in the POC wells have been shown to be consistent with regional ground water quality.

3. During the Third Quarter (June 2007) sampling event, benzene, toluene, ethylbenzene, and total xylenes were detected in GW-22 and GW-23 at the following concentrations:

CONSTITUENT	BENZENE (µg/L)	TOLUENE (µg/L)	ETHYLBENZENE[1] (µg/L)	TOTAL XYLENES (µg/L)
MCL	5	1,000	700	10,000
GW-22	160	1,100	96	700
GW-23	55	150	19	141

(1) Ethylbenzene is not a Site COC.

Since benzene, toluene, ethylbenzene, and total xylenes had not previously been detected in GW-22 and GW-23, the wells were resampled in August 2007. Benzene, toluene, ethylbenzene, and total xylenes were not detected in the August 2007 results in GW-22 or GW-23. Other VOCs also were not detected in GW-22 or GW-23 from the August 2007 results with the exception of TCE being detected below the MCL (5 μg/L) in GW-22 (2 μg/L). No VOCs were detected in GW-26 from the June 2007 results.

5.4.2.3 Near-Source Detection Wells

1. Near-Source Detection Wells are onsite detection wells located near the waste source areas. The objective of near-source detection wells is to detect potential site-related releases of contaminants before impacts are measured at the POC wells. The near-source wells are located closer to the waste unit than POC well or are located directly below waste. Wells GW-10 and -33 were selected as near-source detection wells for long-term ground water monitoring.

2. Manganese was detected above the MCL in GW-10 (0.058 mg/L) and GW-33 (3.7 mg/L). The manganese concentration has decreased in GW-10 from the prior event and historic levels have increased in GW-33. Manganese concentrations in the Near-Source Detection Wells have been shown to be consistent with regional ground water quality. Arsenic, lead, and mercury were not detected in GW-10 or GW-33.

3. VOCs were not detected in GW-10 or GW-33.

5.4.2.4 Verification Wells

1. The verification wells are onsite wells located near the property line of the Site, downgradient of the Site waste source. The verification wells are included to assure that Site contaminants are not migrating offsite and potentially impacting private or municipal water supply wells. The existing downgradient monitoring wells GW-27, -29, and -30 serve as verification wells for long-term ground water monitoring purposes.

2. Manganese was detected above the MCL (0.05 mg/L) in GW-30 (0.10 mg/L) and was not detected in GW-27 or GW-29. Manganese concentrations in the Verification Wells have been shown to be consistent with regional ground water quality. Lead was detected below

the MCL (0.015 mg/L) in GW-29 (0.0055 mg/L) and GW-30 (0.0056 mg/L) and was not detected in GW-27. Arsenic and mercury were not detected in GW-27, GW-29 or GW-30.

3. VOCs were not detected in GW-27, GW-29, or GW-30, with the exception of acetone in GW-27 at a concentration of 12 μg/L. Acetone is a common laboratory contaminant, although it was not indicated in the laboratory QA/QC report.

5.4.2.5 <u>Quality Assurance/Quality Control</u>

1. QA/QC results for the analytical data are presented in Chapter 6.0. Further comments, explanations, and conclusions regarding the results from the Ground Water Monitoring are presented in Chapter 8.0.

5.4.2.6 <u>Statistical Analysis of Ground Water Analytical Data</u>

1. Section 4.6 discusses the approach to statistical analysis of analytical data. The statistical analysis results for ground water data are discussed in this section.

2. Table 5-5 provides the historic and current results of analytical testing of ground water. Statistical analysis was performed on this data. The COCs are defined in Table 5.1 of the OMMP and also in Table 4-1, herein. Appendix C.2 provides the results of the statistical analysis for ground water.

3. The results indicate the ground water data to be in control (i.e., only two exceedances of a prediction limit occurred). The two prediction limit exceedancs occurred for manganese at wells GW-22 and GW-29. Manganese is a naturally occurring constituent in the regional ground water below the site. Significant trends were not identified. These results are consistent with results for ground water discussed in Section 5.4.2 which indicated no unusual exceedances of ground water COCs.

5.5 STORMWATER MONITORING RESULTS

1. Stormwater sampling was not conducted between April 2007 and September 2007 due to a lack of significant rainfall events (e.g., less than 2 inches of rainfall in 24 hours). Routine inspections of monitoring points and stormwater drainage control systems were conducted during this reporting period and the results are presented in Section 3.4 and Appendix A.7.

6.0 QUALITY ASSURANCE/QUALITY CONTROL

6.1 TRIP/FIELD BLANK AND BACKGROUND ANALYSIS RESULTS

1. The soil gas, in-business air, ambient air and ground water monitoring included Summa canister certifications and the analysis of trip/field blanks, duplicates and collection and analysis of background ambient air samples during the Third and Fourth Quarter monitoring and sampling activities. The results for these samples are discussed below and the laboratory analytical results are included in Appendices B and D. Duplicate sample results are included in the corresponding analytical tables noted in Chapter 5.0, Monitoring Results.

6.1.1 IN-BUSINESS AIR AND AMBIENT AIR MONITORING

1. A certification was performed on each lot of in-business and ambient air Summa canisters received from the laboratory. The certifications passed the laboratory requirements for the lots received (e.g., non-detect for TO-15 constituents). Copies of the laboratory certifications are included in Appendix A.11.

2. Trip/field blanks and background sampling are not required for in-business and ambient air monitoring.

3. Three duplicate samples were collected during the Third Quarter and six duplicates were collected during the Fourth Quarter. The duplicate sample results are included in Table 5-2 and, in general, are comparable with the results for the primary samples.

6.1.2 VAPOR WELL MONITORING

1. A certification was performed on each lot of vapor well Summa canisters received from the laboratory. The certifications passed the laboratory requirements for the lots received (e.g., non-detect for TO-15 constituents). Copies of the laboratory certifications are included in Appendix A.11.

2. Three trip/field blank samples were analyzed during the Third Quarter vapor well monitoring event. Methane, TGNMO, and VOCs were not detected in the trip/field blank samples. No trip/field blanks were taken during the Fourth Quarter vapor well monitoring event due to an oversight. This will be corrected in future vapor well monitoring events.

3. Six duplicate samples were collected during the Third Quarter and four duplicate samples were collected during the Fourth Quarter vapor well monitoring events. The duplicate sample results are included in Table 4-3 and, in general, are comparable with the results for the primary samples.

4. Background ambient air samples were collected at Vapor Wells VW-35 and VW-62 during the Third Quarter and at Vapor Wells VW-42 and VW-62 during the Fourth Quarter vapor well monitoring events. The background ambient air sample analytical results are included in Table 4-3. Methane was detected between 1.4 to 1.8 ppmv and some VOCs (i.e., acetone, carbon disulfide, vinyl acetate, 2-butanone, benzene, toluene, m,p-xylene and o-xylene) were detected in the range of 0.51 ppbv to 16 ppbv. The following summarizes the detected constituents and concentration results along with the SGPS for comparison purposes:

SAMPLE	DATE	ANALYTE	RESULT	SGPS
VW-35-Ambient	6/30/2007	methane	1.8 ppmv	12,500 ppmv
	6/30/07	acetone	6.5 ppbv	--
	6/30/07	vinyl acetate	1.8 ppbv	--
	6/30/07	2-butanone	0.84 ppbv	--
	6/30/07	toluene	1.9 ppbv	2,000 ppbv
	6/30/07	m&p xylenes	1 6 ppbv	4,000 ppbv
VW-42-Ambient	9/26/2007	methane	1.4 ppmv	12,500 ppmv
	9/26/2007	acetone	16 ppbv	--
	9/26/2007	carbon disulfide	4.0 ppbv	--
	9/26/2007	2-butanone	2.0 ppbv	--
	9/26/2007	toluene	1 7 ppbv	2,000 ppbv
	9/26/2007	m&p xylenes	0.79 ppbv	4,000 ppbv
VW-62-Ambient	6/30/2007	methane	1 8 ppmv	12,500 ppmv
	9/20/2007	methane	1.4 ppmv	12,500 ppmv
	6/30/2007	acetone	6.0 ppbv	--
	9/20/2007	acetone	7 9 ppbv	--
	6/30/2007	2-butanone	0.89 ppbv	--
	6/30/2007	benzene	0 51 ppbv	10 ppbv
VW-62-Ambient	6/30/2007	toluene	1 7 ppbv	2,000 ppbv
	9/20/2007	toluene	0.80 ppbv	2,000 ppbv
	6/30/2007	m&p xylenes	0.90 ppbv	4,000 ppbv
	9/20/2007	m&p xylenes	0 53 ppbv	4,000 ppbv

6.1.3 GROUND WATER MONITORING

1. Three trip, three field blanks and three equipment rinsate samples were analyzed during the Third Quarter ground water monitoring event. COC metals and/or VOCs were not detected in the trip blanks, field blanks or equipment rinsate samples with the exception of mercury detected at 0.001 mg/L in one field blank sample and acetone and chlorobenzene detected in one equipment rinsate sample at concentrations of 17 μg/L and 2.6 μg/L, respectively.

2. Two duplicate samples were collected and analyzed during the reporting period. The duplicate sample results are included in Table 5-6 and are comparable with the results for the primary samples with the exception of mercury being detected in the duplicate sample for GW-11 at 0.0011 mg/L (detection limit of 0.0002 mg/L) and lead being detected in the duplicate sample for GW-30 at 0.0056 mg/L (detection limit of 0.005 mg/L).

6.2 DATA VALIDATION RESULTS

1. The soil gas, in-business air, ambient air, and ground water samples collected and analyzed during the Third and Fourth Quarter monitoring and sampling activities along with the associated laboratory samples and the QA/QC data were reviewed by Veridian Environmental, Inc. (Veridian), located in Davis, California. The Veridian findings are summarized below and were based on comprehensive reviews of Level III deliverables from Columbia Analytical Services, Inc. for the soil gas, in-business air, and ambient air samples and Level II deliverables from TestAmerica for the ground water samples with regard to holding times, blank analysis results, surrogate recoveries, laboratory, and field duplicate recoveries, internal standard recoveries, analytical sequence and instrument sensitivity. Most of the data was found to meet the general requirements for compliance, accuracy, and precision. The data that did not meet the general requirements are summarized below.

6.2.1 VALIDATION FOR THIRD QUARTER VAPOR SAMPLING

1. Nine out of 76 vapor well, in-business air, and ambient air samples (including trip/field blanks and field quality control samples, but not including laboratory duplicate samples) that were analyzed by Columbia Analytical Services, Inc. were validated by Veridian (approximately 10 percent of the total number of vapor samples). The samples validated were VW-29-S, VW-29-I, VW-29-D, VW-46-S, VW-46-I, VW-46-D, VW-46-D-SC, IBM-32, and IBM-32-SC.

2. Acetone detected in vapor well sample VW-46-S, vinyl acetate detected in vapor well samples VW-29-S, VW-29-I, and VW-29-D, and styrene detected in vapor well samples VW-29-I and VW-29-D may be lower than reported by the laboratory (J) due to matrix interference. The laboratory identified the matrix interference as due to difficulty in distinguishing the quantitative ions between vinyl acetate, acetone, styrene, and 1,3-butadiene.

3. Acetone in in-business samples IBM-32, IBM-32 (Duplicate) and IBM-37 and in vapor well samples VW-29-D, VW-31-S, VW-31-D, VW-42-S, VW-42-D, VW-46-S, VW-46-I, VW-46-D, VW-46-D (Duplicate), VW-55-S, VW-55-D, VW-61-S, VW-61-I, and VW-61-D was estimated by the laboratory (J) due to the relatively high standard deviation in the initial calibration.

4. Analytical results for acetone in IBM-32, IBM-32 (Duplicate), and IBM-37 may be higher than reported by the laboratory (UJ/J) due to high percent differences coupled with decreased instrument sensitivity in continuing calibration standards.

5. Analytical results for vinyl acetate in VW-29-S, VW-29-I, VW-56-S (Duplicate), VW-56-I, and VW-56-D may be lower than reported by the laboratory (J) due to high percent differences coupled with increased instrument sensitivity in continuing calibration standards.

6. Acceptable precision and sample respresentativeness was demonstrated in comparing samples IBM-32 with IBM-32 (Duplicate) and VW-46-D with VW-46-D (Duplicate) for all results except for carbon disulfide (i.e., carbon disulfide was 1.3 ppbv in the primary sample and <0.58 ppbv in the duplicate).

7. For additional details refer to the Columbia Analytical Services, Inc. laboratory reports in Appendices B.3 and B.5 and the Veridian Environmental Data Validation Report, in Appendix E.1.

6.2.2 VALIDATION FOR FOURTH QUARTER VAPOR SAMPLING

1. Nine out of 82 vapor well, in-business air, and ambient air samples (including trip/field blanks and field quality control samples, but not including laboratory duplicate samples) that were analyzed by Columbia Analytical Services, Inc. were validated by Veridian

Environmental, Inc. (approximately 10% of the total number of vapor samples). The samples validated were VW-41-S, VW-41-D, VW-41-D (Duplicate), VW-39-S-S, VW-39-D, VW-37-S, IBM-42, and IBM-12, and IBM-12 (Duplicate).

2. Acetone in vapor well samples VW-39-S, VW-39-D, and VW-37-S and in in-business samples IBM-42, IBM-12, and IBM-12 (Duplicate) may be lower than reported due to matrix interference. The laboratory identified the matrix interference as due to difficulty in distinguishing the quantitative ions between vinyl acetate, acetone, and 1,3-butadiene. Acetone in in-business samples IBM-42, IBM-12, and IBM-12 (Duplicate) may also be lower than reported due to high recovery in the associated Contract Required Quantitation Limit (CRQL) standard with increases in sensitivity in continuing calibration standards.

3. Chloromethane detected in vapor well samples VW-37-S, VW-39-S, VW-39-D, VW-41-S, VW-41-D, and, VW-41-D (Duplicate) may be higher than reported due to decreases in instrument sensitivity in continuing calibration standards. Chloromethane detected in vapor well samples VW-41-S, VW-41-D, and VW-37-S may be higher than reported due to low percent recoveries in associated laboratory control samples.

4. Acceptable precision and sample respresentativeness was demonstrated in comparing samples IBM-12 with IBM-12 (Duplicate) and VW-41-D with VW-41-D (Duplicate) for all results except for acetone in IBM-12 (29 ppbv) and IBM-12 (Duplicate) (20 ppbv) and methylene chloride (6.3 ppbv and non-detect less than 0.46 ppbv), toluene (6.8 ppbv and 5.1 ppbv), PCE (4.5 ppbv and 3.2 ppbv), and m,p-xylenes (3.2 ppbv and 2.2 ppbv) in duplicate samples VW-41-D and VW-41-D (Duplicate), respectively.

5. For additional details refer to the Columbia Analytical Services, Inc. laboratory reports in Appendices B.4 and B.6 and the Veridian Environmental Data Validation Report for the Fourth Quarter, in Appendix E.2.

6.2.3 VALIDATION FOR THIRD QUARTER GROUND WATER SAMPLING

1. Three randomly selected samples (GW-01, GW-11, and GW-26) out of 30 ground water samples (including trip/field/rinsate blanks and field quality control samples, but not including laboratory duplicate samples) that were analyzed by TestAmerica, Inc. were validated by Veridian (10 percent of total number of ground water samples).

2. All samples were received at a temperature of 7^0 C and did not meet the project-specified requirement of 2^0 C to 6^0 C. Since the samples were below 10^0 C, qualification of the data was not warranted.

3. The pH analysis for all samples collected was conducted within one day of sample receipt and 36 hours of sample collection.

4. Since calcium, magnesium, and sodium concentrations exceeded four times the spike levels in the matrix spike/matrix spike duplicate analysis of sample GW-01, an assessment of matrix effects could not be made for these analytes.

5. An assessment of precision could not be made for total dissolved solids since the laboratory duplicate analysis was performed on a non-project sample.

6. Calcium, magnesium, sodium, chlorides, sulfates, and total dissolved solids concentrations in all ground water monitoring wells and duplicate samples were greater than five times the concentration in rinsate blank FR-27 and, as a result, qualification of these analytes was not warranted.

7. Mercury in GW-02 was greater than five times the concentration in field blank FB-27 and, as a result, qualification of this result in GW-02 is not warranted. Mercury concentrations in GW-11 (Duplicate), GW-22, and GW-26 were not greater than five times the concentration in field blank FB-27 and, as a result, qualification of these results is warranted.

8. For additional details refer to the TestAmerica, Inc. laboratory reports in Appendix D and the Veridian Environmental Data Validation Report for the First Quarter in Appendix E.3.

7.0 INSTITUTIONAL CONTROLS MONITORING AND ENFORCEMENT REPORT

7.1 SITE DESCRIPTION

1. This section provides a monitoring and inspection report in accordance with the Institutional Controls Monitoring and Enforcement Work Plan (ICMEWP) for the Waste Disposal Inc. Superfund Site, dated November 28, 2005. The WDIG Site Trust conducts quarterly Institutional Control monitoring and enforcement inspections of the properties at the WDI Site for which an Environmental Restriction Covenant (ERC) has been recorded. In addition to the quarterly formal inspections, informal inspections are conducted each time a project team representative visits the site/parcel(s).

2. This ICMEWP report will be a part of the Semi-Annual and Annual OM&M Reports. The inspection and reporting began with the 2006-2007 OM&M time period. The annual period begins October 1 and ends September 30.

3. The ICMEWP contains Institutional Control and Environmental Restriction Covenant monitoring and enforcement provisions to limit human exposure to potentially contaminated materials as well as protect the integrity of the remedial action. It is the responsibility of the WDIG Site Trust to monitor the ERCs and enforce violations on all properties where an ERC has been recorded.

7.2 ICMEWP REQUIREMENTS

1. Institutional Controls (ICs) are required by the AROD to ensure the long-term integrity of the remedy and to prevent exposure to waste remaining at the Site. In general, the purpose and objectives of the ICs are:
   - To provide notification to all potential Site users of the presence of hazardous materials and on-site contamination;
   - To provide notification to potential Site users concerning the presence and location of all remedial systems;
   - To expressly prohibit residential land use on any part of the Site and limit future uses to certain industrial activities;
   - To minimize the potential for exposure of future Site users to Site related hazardous materials (including waste materials, groundwater, and/or soil gas emissions);

- To protect the integrity of the remedy from any activity that may interfere with the effective O&M of remedial control and monitoring systems;
- To provide access to the Site for appropriate regulatory agencies and responsible parties engaged in approved remedial actions and monitoring activities.

2. ERCs are the legal instruments that define and enforce the ICs. The primary purpose of the ERC is to protect present or future human health or safety or the environment as a result of the presence on the land of hazardous substances. The CD requires the WDIG Site Trust to be the covenantee of the ERCs and part of its responsibilities as covenantee include monitoring and enforcing the ERCs. These ERCs are enforceable under California Law against all future property owners and tenants. The ERCs will provide access on the land to the EPA and the potentially responsible parties (PRPs) conducting the remedial action and their contractors. The following activities are examples of ERC requirements:
    - Monitoring the remedial action and OM&M activities;
    - Verifying any data or information submitted to EPA or the State;
    - Conducting investigations relating to contamination at or near the Site;
    - Obtaining samples;
    - Assessing the need for, planning, or implementing additional response actions at or near the Site;
    - Assessing implementation of quality assurance and quality control practices as defined in the approved Quality Assurance Project Plans;
    - Implementing the remedial action, monitoring, and O&M;
    - Assessing compliance with the access easements and environmental restrictions; and
    - Determining whether the Site or other property is being used in a manner that is prohibited or restricted by the environmental restrictions, or that may need to be prohibited or restricted.

3. The ERCs also include land and water use restrictions to prohibit and restrict certain activities at the Site that may adversely affect the implementation, integrity, or

protectiveness of remedial measures. The owners and occupants must comply with these restrictions, unless approved by EPA. The following activities are examples of ERC requirements for land/water restrictions:

- Placement of warning signs or other posted information shall be allowed and, once posted, no removal or interference with such signs or information shall be permitted.
- Placement of Site access controls, such as gates or fencing, shall be allowed and not damaged or circumvented.
- The Site shall not be used in any manner that may interfere with the integrity of the remedial cap or other components of the remedy.
- Construction not approved by EPA that impacts any of the remedial capping or other remedy components shall not occur.
- No interferences with or alternations to the grading, vegetation, and surface water drainage controls shall be made.
- Portions of the Site or property underlain by waste and in soil gas noncompliance shall not be regraded.
- Areas of asphalt or concrete pavement shall not be removed or improved.
- No penetrations or interferences with the remedial cap or areas with remedial controls shall be made.

4. In addition, the ERCs provide that if an Owner or an Occupant constructs a new building or other permanent structure on the property or substantially modifies an existing building or other permanent structure on the property, and such modification requires a City of Santa Fe Springs building or land use permit, Owner or Occupant shall implement and maintain any necessary engineered capping system(s) and any necessary engineering control(s) related to the new or modified building or other permanent structure, in conformance with the provisions of the AROD and as specified by EPA. Such capping systems and engineering controls shall be implemented only with the prior written approval of EPA.

7.3 MONITORING AND INSPECTION FINDINGS FOR THE SECOND HALF OF FY 2006-2007

1. The primary purpose of the ICMEWP is to document and report any violation of the ERCs. To facilitate identifying violations of the ERC, a checklist was developed and included in Figure 4 of the ICMEWP. A copy of each checklist will be included in reports to the EPA for each parcel. This approach recognizes that inspection and monitoring obligations are

parcel specific. Thus, Appendix F presents a checklist for each parcel. The ICs have been categorized on the checklist into the various site controls to facilitate evaluating compliance.

2. The checklist presents a plan view of key features at each parcel, an overview of parcel information, and the results of inspection of the applicable site controls. The plan view includes an aerial view of the parcel, as well as a plan showing the cover and monitoring features installed within the parcel. Each of these two detailed views is referenced to an overall plan of the site (i.e., a Key Plan).

3. For each of the established site controls, the approach to inspection and monitoring is stated, and the findings listed. When "inspection" is indicated, this is indicative of a physical site visit, while when "monitoring" is indicated, this is indicative of remote review of land use and activity records. Dependent upon the site control objective, an appropriate combination of inspection and monitoring is applied.

4. While routine visits to the Site occur periodically, formal inspections are conducted to support completion of the IC Checklist. Ongoing land use and activity monitoring occurs continuously throughout the monitoring period.

5. Occasionally maintenance is required. Compliance with the site requirements is evaluated after the maintenance is performed. Any maintenance required to restore site control is listed as "Remedial Action" within the IC Checklist.

6. During this semi-annual period, the City of Santa Fe Springs made available an updated general plan. The plan indicates that zoning and land use across all site parcels continues to be industrial, a designation consistent with the ICMEWP. Figure 7.1 illustrates the General Plan Land Use of the City of Santa Fe Springs.

7.3.1 PARCEL INFORMATION

1. The force of the ERCs is derived from the knowledge of the landowner and their tenants of the land use and activity limitations imposed by the ICs. Therefore, the routine confirmation of current ownership and occupancy across the site establishes ownership and occupancy, and would elucidate any new owners and tenants.

- **Inspection and Monitoring Approach**. The ownership of properties is monitored by a record review derived from Los Angeles County Land Records. The tenancy is derived from a site inspection.
- **Summary Findings**. Tables 2-1 and 5-3 describe the Site ownership and tenancy, respectively. There have been no property sales since the last update of Table 5-3. New tenants are present at the site and included in Table 2-1.

2. Below are described the various Site Controls included in the Checklist and the approach to compliance inspection. The findings of the inspection are provided on the checklist, Appendix F, with key findings discussed in Section 7.3.

7.3.2 SIGNAGE

1. Signage is utilized at the site to provide hazard notice to third parties.

2. Figure 4.5 of the OMMP provides signage locations at the Site. During the inspection, Site Conditions were compared to this figure. Signage is not present on all parcels, and therefore the IC Checklist specifies "N/A" for those parcels where signage was not provided. The presence and condition of the sign is verified through Site inspection.

7.3.3 REMEDY INTEGRITY

1. The broad objective is preserving the integrity of the Subtitle C & D equivalent covers and the overlying drainage features. The IC Checklist incorporates nine site controls that serve to preserve remedy integrity.

2. Site controls were inspected as applicable. These included inspections of fencing, RCRA C & D equivalent covers, new construction, grading and drainage systems, as well as controlling vegetation, and assuring no waste is excavated without EPA approval. Figures 4.0 and 4.4 of the OMMP were referenced during the inspection. Monitoring was performed to detect and prevent any excavations or new construction that could contact the waste or remedy components.

7.3.4 VEGETATION

1. This Site Control limits any new plants, changes to and use of irrigation and pesticide/herbicide use unless approval is provided. Inspection is utilized to observe for any new plantings or irrigation changes.

7.3.5 LIQUIDS RECOVERY SYSTEM

1. A liquids control system is present in Parcel 26. This system is inspected to assure that it is not interfered with.

7.3.6 DRAINAGE

1. This Site Control seeks to preserve the integrity of the drainage system that was installed as part of the remedy. Figures 4.0 and 4.4 of the OMMP are utilized during the inspection to locate components. Drainage channels or pipes should not be blocked, rerouted or otherwise interfered with.

7.3.7 GAS CONTROLS

1. This Site Control seeks to preserve the integrity of gas controls whether they are placed outside or within a building interior.

2. Maintenance of these controls is through inspection. Buildings that overlie waste will have their slabs and/or foundations inspected for integrity. If and when controls or sensors are placed indoors, they shall be inspected to record that they have not been circumvented. Similarly, when alarm systems are in-place, they too shall be inspected to see that they have not been interfered with. There are presently no parcels with indoor gas controls, sensors or alarms installed as part of the remedy. Figure 4.0 of the OMMP was used to identify parcels were the cover consisted of concrete with sealed cracks. These were inspected for continued integrity and the presence of unsealed cracks.

7.3.8 MONITORING POINTS

1. The Site contains numerous monitoring points including ground water monitoring wells, soil gas probes, reservoir leachate collection wells, biovent wells, and survey monuments. The Site controls seek to preserve these points, maintain labeling, allow access and check

they are secured. In addition, new monitoring wells and water supply wells are prohibited from being installed.

2. The condition of the monitoring points is visibly inspected by parcel, and maintenance is performed as needed. Figures 4.0, 4.1, and 5.0 of the OMMP are utilized to locate the monitoring points for inspection. The placement of new monitoring wells or water wells is monitored through the use of the excavation clearance system, as well as by visual inspection.

7.3.9 REGULATIONS

1. This Site Control is administrative, and preserves the right of access to the properties, as well as establishes the compliance requirements for Waste Discharge Requirements and Hazardous Waste Disposal requirements.

7.4 KEY CHECKLIST FINDINGS

1. The findings of the ICMEWP inspections and monitoring are provided in Appendix F. All Site Control items were found to be in compliance for all parcels and a 'yes' is entered against the item. For Site Control items that do not apply to a parcel, a N/A is entered against the item to so indicate. For those items that are not in compliance, a 'No' will be entered against the item and further discussion provided.

2. Although no Site Controls were out of compliance, a few observations were made or notifications received that are discussed below:

   - **Parcel 32 -** A crack located to the left of the entry way of the business, has a 3-4" gap missing in the sealed crack. The crack appears to go beneath a large fixed cabinet. Evaluation of the in-business air monitoring results was performed and found that TCE was measured at 0.69 ppbv in the Third Quarter versus an IATL of 0.56 ppbv. The Fourth Quarter result was below the detection limit of 0.32 ppbv. Historically, concentrations have been as high as 8.3 ppbv. Chemicals such as TCE are to be expected in business air at this parcel as a result of the use of the property by the tenant for the manufacturing of plastic parts. Therefore, it is our recommendation that no action is necessary at this time. Further evaluation of the in-business air monitoring results will occur as new data becomes available.

- **Parcel 41** – A crack located in the entry way of the business, has a 6-8" gap missing in the sealed crack. Evaluation of the in-business air monitoring results was performed and found that toluene was measured at 690 ppbv in the third quarter versus an IATL of 212 ppbv. The Fourth Quarter result was measured at 22 ppbv. Other VOC parameters (e.g., carbon tetrachloride, benzene, chloroform, 1,2 dichloroethane, vinyl chloride, 1,2 dichloropropane, TCE, & 1,2 dibromoethane) were at or below their respective detection limits that were above the IATLs. In all these cases, the fourth quarter result was below the IATLs. Therefore, it is our recommendation that no action is necessary at this time. Further evaluation of the in-business air monitoring results will be evaluated as new data becomes available.
- **Parcel 43** - This parcel is up for lease as of January 10, 2008 and will be noted as such in future Parcel Specific IC Checklists.
- **Parcels 49** – A shrub on the southeast corner of the parcel was observed to be growing into the fence from outside of the property and is being removed as part of routine O&M activities.

3. The Site inspection indicated that brackets holding the Site security fencing to the fence posts are coming loose at select locations due to the pressure of the sand bags that are placed against the fence for sediment control. The brackets are being reattached to the fence post and the sand bags removed from the area since sediment control is no longer required. This activity is being completed as part of routine O&M activities.

8.0 CONCLUSIONS AND RECOMMENDATIONS

8.1 GAS MIGRATION CONTROL SYSTEM

8.1.1 RESERVOIR GAS COLLECTION SYSTEM

1. The system performance requirements for the Reservoir Gas Collection System are summarized in Table 3-1 and the activities and results from April 2007 through December 2007 of OM&M are presented in Chapters 3.0, 4.0 and 5.0. The results indicate that minimal levels of organic vapors are being extracted from the reservoir system.

2. Methane influent levels were low at concentrations ranging from 75 to 690 ppmv, which is equivalent to 0.3 to 2.0 pounds per day of methane at the measured Reservoir Gas Collection System flow rate of approximately 50 scfm. The exception to this was the methane levels during September 2007 OM&M activities, in which methane concentrations were detected at 1,200 ppmv, which was above the active operation criterion of 2.3 pounds per day. However, methane levels decreased back down to less than 2.3 pounds per day during the next two events. Since the calculated average daily methane emission levels for this reporting period and the full year were below the criterion of 2.3 pounds per day, the system was converted to the passive mode after one year of "active" operation had been completed.

3. The TGNMO inlet levels were low and ranged from 2.1 to 17 ppmv as methane (i.e., equivalent to 0.4 to 2.8 ppmv as hexane). Therefore, the TGNMO concentrations are well below the criterion of 20 ppmv as hexane for the system performance requirement of reducing non-methane organics.

4. The maximum total VOC inlet concentration from the Reservoir Gas Collection System was approximately 7,350 ppbv based on the analytical data, which is equivalent to 0.2 pounds of VOCs per day at the measured flow rate of approximately 50 scfm and an average molecular weight of the constituents in the vapor stream estimated to be 60 pounds per pound mole (average molecular weight heavily weighted by acetone). The maximum total VOC inlet concentration during this period was largely a result of acetone being detected at 7,000 ppbv in the inlet sample from August 2007. Even with the elevated acetone concentration, this VOC inlet rate is well below the SCAQMD performance requirement of less than one pound per day and, therefore, the system was converted from active operation to passive mode and no SCAQMD permit is required.

8.1.2 IN-BUSINESS AIR MONITORING RESULTS (BUILDING MODIFICATIONS)

1. The system performance requirements for the Building Modifications are summarized in Table 3-1 and the activities and results from the Third and Fourth Quarters of FY 2006-2007 are presented in Chapters 3.0, 4.0 and 5.0. The results do not indicate that gas migration to in-business air locations is occurring.

2. The results presented in Chapter 5.0 indicate that the majority of the constituents analyzed were below the IATLs (e.g., methane and most of the VOCs). The results for four specific VOCs were above the IATLs in certain business locations (i.e., benzene in IBM-21 and IBM-22, TCE in IBM-32, PCE in IBM-37, and toluene in IBM-41). The specific constituents reported above the IATLs are highlighted in Table 5-2 and discussed further in the following paragraphs.

3. The benzene concentrations in location IBM-21 that exceeded the IATL of 2.0 ppbv ranged from 92 to 97 ppbv in the Third Quarter of FY 2006-2007. The previous maximum benzene concentration in IBM-21 was 1.7 ppbv. A chemical inventory was conducted at Parcel 21 in November 2007 to determine any potential sources of benzene. The current tenant is Chillers Services, an air conditioning and demolition contractor. The inventory results are summarized in Table 5-3 and documented the presence of several products that contained solvent type materials. The inventory also identified two products manufactured by CalWestern Paint that contained benzene. The subsequent Fourth Quarter of FY 2006-2007, benzene concentrations in IBM-21 ranged from 0.70 ppbv to 0.74 ppbv. The increase in benzene concentrations in IBM-21 during the Third Quarter was likely associated with tenant activities.

4. The benzene concentrations in location IBM-22 that exceeded the IATL of 2.0 ppbv ranged from 2.1 ppbv to 2.3 ppbv during the Fourth Quarter of FY 2006-2007. Benzene has been detected at similar or higher concentrations in prior monitoring events at this location and is likely associated with tenant activities as noted in the CTR (TRC, 2006c). Also, ambient air samples IBM-49(AMB) contained benzene at levels ranging from 0.52 ppbv to 0.55 ppbv, which may have contributed to the measured in-business concentrations (see Section 5.1.3, Ambient Air Monitoring Results in Chapter 5.0). If the background benzene level in ambient air is subtracted from the measured in-business air results, benzene results in IBM-22 would not exceed the IATL of 2.0 ppbv (i.e., IBM-22: 2.3 ppbv - 0.52 ppbv = 1.78 ppbv benzene).

5. *TCE concentrations in location IBM-32 during the Third Quarter of FY 2006-2007* (ranging from 0.64 ppbv to 0.69 ppbv) were only slightly above the IATL (0.56 ppbv). TCE was not detected (< 0.32 ppbv) in IBM-32 during the subsequent Fourth Quarter of FY 2006-2007 monitoring event. Also, TCE was not detected in the ambient air monitoring results during the Third or Fourth Quarter. Based on the types of materials present in this business as noted in Table 5.3, the TCE was likely associated with tenant activities.

6. The PCE concentration that exceeded the IATL of 10.6 ppbv in the Third and Fourth Quarters 2007 in the location IBM-37 ranged from 53 ppbv to 200 ppbv. PCE concentrations have been detected at similar or higher concentrations in prior monitoring events at this location and are likely associated with tenant activities as noted in the CTR (TRC, 2006c) and based on the materials present (see Table 5.3). PCE was not detected in the ambient air monitoring results during the Third or Fourth Quarter.

7. The toluene concentration in the Third Quarter of FY 2006-2007 in the location IBM-41 (690 ppbv) exceeded the IATL of 212 ppbv. This concentration of toluene was higher than previous concentrations (previous maximum historical concentration of 270 ppbv) but was within the same order of magnitude as previously detected concentrations. Toluene concentrations have also fluctuated over time at this location. Carpentry and cabinet manufacturing work is performed at this location and the presence of toluene is likely associated with the observed use of gasoline, paints, stains, varnishes, and thinners (see Table 5.3). Toluene was detected in the ambient air monitoring results during the Third or Fourth Quarter, however, the results were too low (i.e., 0.59 to 1.8 ppbv) to have an impact on the in-business air results.

8. As noted in Chapter 5.0, several VOC constituents were not detected but had reporting limits above IATLs. These higher reporting limits occurred for 21 constituents over the reporting period. Seventeen of the 21 higher reporting limits occurred in two locations, IBM-37 and IBM-41 as a result of laboratory sample dilution requirements due the presence of other elevated VOCs (i.e., PCE = 54 to 200 ppbv in IBM-37 and toluene = 690 ppbv in IBM-41). In most cases, the reporting limit was only slightly above the IATL and/or there was no historical data indicating prior elevated levels. Therefore, these results are unlikely to represent potential IATL exceedances. The exception to this was benzene in IBM-41, which has been identified with historical benzene exceedences slightly above the IATL at this sampling location. However, ambient air samples IBM-49(AMB) contained

benzene at levels ranging from 0.52 ppbv to 0.55 ppbv, which may have contributed to measured in-business concentrations as noted in Item 4 above for IBM-22.

9. Based on these results and the Decision Matrix for In-Business and Ambient Air Monitoring shown in Figure 4-1, the monitoring frequency after the first year of OM&M is recommended to be reduced to semi-annual but will continue to be quarterly pending EPA approval.

8.1.3 SENTINEL BIOVENT SYSTEM

1. The Sentinel Biovent Well System is a secondary Gas Migration Control System for the WDI Site. Vapor samples were not collected from the biovent wells as their purpose is to provide air for natural biodegradation.

2. A semi-annual inspection was performed for each well during this reporting period to verify the integrity of well head components. The wellhead components and casings were found to be in good condition at the time of inspection.

8.2 LEACHATE MONITORING/CONTROL SYSTEM

1. The performance requirements for the Leachate Monitoring/Control System are summarized in Table 3-1 and the management strategy to reduce and maintain liquid levels is summarized in Chapter 3.0. Based on the results presented in Chapter 5.0, the liquids management strategy implemented during the first 12 months of OM&M was successful in reducing and/or maintaining the liquid levels in LC-1 and LC-3. The liquids in LC-2 and LC-4 continued to recover to levels requiring bailing twice per week.

2. The results in Chapter 5.0 indicate that liquids in LC-1 recover to over 1.0 foot but less than 6.0 feet between monitoring events and, therefore, this well will continue to be monitored and bailed weekly. The liquids in LC-3 typically recover less than 1.0 foot between monitoring events and, therefore, this well will continue to be monitored once per week and bailed when the liquid level exceeds 1.0 foot.

3. The liquid levels in LC-2 and LC-4 recover to over 6.0 feet between monitoring events. Manual bailing was discontinued from these two wells in November 2007, and an automated limited duration pumping system, approved by the EPA, was installed and activated for each well in December 2007.

8.3 SOIL GAS MONITORING SYSTEM

8.3.1 VAPOR MONITORING WELLS

1. The system performance requirements for the vapor monitoring wells are summarized in Table 3-1. Historical data from previous vapor well monitoring events along with the results from the first six months of OM&M are presented in Chapter 5.0 and Table 4-3. The data in the table is separated for Compliance Vapor Wells (wells that have been historically below the SGPS) and Non-Compliance Wells (wells that have historically been above the SGPS for various constituents). The designations of Compliance and Non-Compliance Vapor Wells are described in Chapter 4.0.

2. The conclusions regarding the Compliance and Non-Compliance Vapor Well sampling performed during the Third Quarter and Fourth Quarter of FY 2006-2007 are presented below.

8.3.1.1 Compliance Vapor Wells (VW-29 to -39, -41 and -42)

1. The methane results for the 25 nested Compliance Vapor Wells as noted in Chapter 5.0 were very low (e.g., maximum of 3.2 ppmv) or non-detect and are well below the SGPS limit of 5 percent (i.e., 50,000 ppmv) at the Site boundary. The exceptions to this was VW-34-S, where methane increased from historical low values (e.g., ND to 2.4 ppmv) to 130 ppmv in the Fourth Quarter, and VW-38-D, where methane was measured between 410 and 730 ppmv, although these results are consistent with historical fluctuations. These methane results are still significantly lower than the SGPS standard for methane in Compliance Vapor Wells. The TGNMO results were also low (e.g., maximum of 15 ppmv) and consistent with the low methane and VOC results. The VOC results were below SGPS limits, except as noted below. These results (i.e., methane, TGNMO, and VOCs) indicate that gas migration from the remaining wastes at the WDI Site is not occurring and/or is not significant. However, subsurface biodegradation changes appear to be occurring, which may affect gas migration conditions as described below for benzene.

2. The results presented in Chapter 5.0 indicate that the majority of the VOC constituents were below the SGPSs. The analytical results for two specific VOCs in certain well locations were above the SGPSs (i.e., benzene in 17 locations and TCE in one location). The occurrences of the specific constituents above the SGPSs are discussed below.

3. Benzene was detected above the SGPS of 10 ppbv in 17 of the 25 Compliance Vapor Well locations (i.e., VW-29-S, VW-29-I, VW-29-D, VW-31-S, VW-31-D, VW-34-S, VW-34-I, VW-34-D, VW-35-S, VW-35-D, VW-36-S, VW-37-S, VW-37-D, VW-41-S, VW-41-D, VW-42-S, and VW-42-D) during this reporting period. There were 15 exceedances in the Third Quarter (including two duplicates) and eight exceedances in the Fourth Quarter. The benzene concentrations in these 17 wells ranged from 11 to 55 ppbv. For 11 of these 17 wells and one additional Compliance Vapor Well (VW-39-S), benzene concentrations were above historical levels and prior exceedances. These current period results compare to 14 wells with benzene exceedances during the First and Second Quarters, 7 wells during the Compliance Testing period and only one well prior to remedy implementation.

4. Based on the ambient air and QA/QC results, the benzene exceedances do not appear to be associated with ambient air conditions or laboratory handling/testing procedures. Ambient air samples collected near Compliance Vapor Wells VW-35 and VW-42, and Non-Compliance Vapor Well VW-62, and for in-business ambient air locations IBM-24 (AMB) and IBM-49 (AMB) during the Third and Fourth Quarters FY 2006-2007 indicated ambient air benzene levels of up to 0.55 ppbv. Duplicate samples were also collected and analyzed in two of the thirteen exceedence locations in the Third Quarter and indicated comparable benzene results. Also, QA/QC results from Summa canister certifications and trip/field blanks analyzed during the Third and Fourth Quarters FY 2006-2007 were non-detect for benzene and other VOCs.

5. For 12 of the 25 Compliance Vapor Wells, benzene concentrations in the Third and/or Fourth Quarter 2007 exceeded historical levels and/or prior exceedences. As discussed below, the above conditions maybe due to a change in organic decomposition processes (i.e., an increase in aerobic and decrease in anaerobic decomposition). Since aerobic decomposition occurs at a higher rate than anaerobic, a change/increase in soil gas migration may be occurring. This change may be moving soil gas including benzene from areas containing waste to non-waste containing areas (e.g., Compliance Vapor Well locations).

6. TCE was detected above the SGPS of 200 ppbv in well VW-35-D during the Third and Fourth Quarters of FY 2006-2007 monitoring events at concentrations ranging from 290 ppbv to 420 ppbv. Although the TCE level was above the SGPS, it has been detected historically in this well in the typical range of 730 to 1,700 ppbv and has exceeded SGPS levels in 16 of 17 monitoring events since the First Quarter of 1998. The levels are generally trending downward. The TCE in this well is likely associated with a nearby source that is dissipating and/or degrading over time.

7. As noted in Chapter 5.0, several VOC constituents were not detected but had reporting limits above SGPSs. These higher reporting limits occurred for 11 constituents over the reporting period. The higher reporting limits occurred in three locations, VW-30-I, VW-30-D and VW-35-D, as a result of laboratory sample dilution requirements due the presence of other elevated VOCs (i.e., acetone = 1,300 ppbv in VW-30-I, acetone = 5,100 ppbv in VW-30-D and TCE = 290 to 420 ppbv in VW-35-D). In most cases, the reporting limit was only slightly above the SGPS and/or there was no historical data indicating prior elevated levels and, therefore, these results are unlikely to represent potential SGPS exceedences. The exception to this was benzene in VW-30-I in the Fourth Quarter with a reporting limit of 19 ppbv versus the SGPS of 10 ppbv. Benzene was detected in VW-30-I at concentrations ranging from 15 ppbv to 20 ppbv in the Second Quarter.

8. These constituents (i.e., benzene and TCE) along with other VOCs will be monitored and further evaluated during subsequent long-term monitoring events.

9. The fixed gas results (e.g., nitrogen, oxygen, carbon monoxide, and carbon dioxide) along with the methane results indicate that the primary biodegradation mechanism near the Compliance Vapor Wells is likely aerobic due to the elevated carbon dioxide and nitrogen levels, reduced oxygen levels and relative absence of significant methane levels. Also, several wells exhibited trends of decreasing oxygen and increasing carbon dioxide levels after remedy implementation. Although methane levels were not significant and data for nitrogen, oxygen, carbon monoxide and carbon dioxide were not collected prior to remedy implementation, the fixed gases indicate an aerobic condition after implementation. This suggests the remedy may be supporting an increase in oxygen flow into the soil as a result of operation of the Reservoir Gas Collection System and biovent wells. Note that aerobic decomposition is a more rapid degradation process than anaerobic degradation. Thus, more gas generation/migration may be occurring now than prior to remedy implementation.

10. The frequency of monitoring Compliance Vapor Wells is based on the Decision Matrix Criteria for Soil Gas Monitoring Data shown in Figure 4-2. With EPA approval, it has been determined that the monitoring frequency will be switched from quarterly to semi-annually (First and Third Quarters) beginning in the First Quarter of FY 2007-2008 (December 2007).

8.3.1.2 <u>Non-Compliance Vapor Wells (VW-25, -46, -49, -51, -55, -56, -58, -61 and -62)</u>

1. The results for the Non-Compliance Vapor Wells sampled during the Third and Fourth Quarters of FY 2006-2007 are discussed below. In general, constituent levels were similar or declining compared to prior events with some key exceptions (i.e., methane, benzene, and fixed gases).

2. Most of the 25 nested Non-Compliance Vapor Well results showed similar methane levels as compared to Compliance Testing period and the First and Second Quarter results. Increases or decreases in levels in most wells were not significant. However, significant methane decreases, in some cases several orders of magnitude, were noted in a few wells after remedy implementation as compared to before prior to remedy implementation, (i.e., VW-25-D, VW-46-S, VW-51-I, VW-51-D, VW-55-I, VW-55-D, VW-62-I and VW-62-D). The reason for decreasing methane concentrations in these well locations is likely due to soil gas changes resulting from a change in organic decomposition processes (i.e., an increase in aerobic and decrease in anaerobic decomposition) as noted previously and discussed below. An exception to this is VW-51-I where methane levels were in the 20 percent to 90 percent range prior to remedy implementation and then dropped to less than a hundred ppmv after implementation but have increased to 34,800 ppmv in the Fourth Quarter. This result indicates that, although declines have occurred, significant anaerobic decomposition may still be occurring in some locations.

3. The specific VOC concentrations ranged from non-detect to levels similar to historical maximum concentrations in Non-Compliance Vapor Well locations (e.g., PCE = 620 ppbv in VW-49-I, benzene = 52 ppbv in VW-51-D and 17 ppbv in VW-56-S, trichlorofluoromethane = 1,100 ppbv in VW-46-I, and 1,1,1-trichloroethane = 20 ppbv in VW-58-D). Benzene, PCE, carbon disulfide, toluene, chloroform, trichlorofluoromethane,

and 1,1,1-trichloroethane remained higher or increased above historical maximum concentrations in some Non-Compliance Vapor Wells during the Third and Fourth Quarter events:

- Benzene = 62 ppbv in VW-46S, 71 ppbv in VW-46-I, 69 ppbv in VW-46-D, 30 ppbv in VW-49-S, 12 ppbv in VW-56-D, 18 ppbv in VW-58-I, 14 ppbv in VW-58-D, 43 ppbv in VW-61-S, 38 ppbv in VW-61-D, and 14 ppbv in VW-62-D.
- PCE = 19 ppbv in W-46-S.
- Carbon Disulfide = 79 ppbv in VW-51-I and 20 ppbv in VW-61-D.
- Toluene = 13 ppbv in VW-56-D.
- Chloroform = 17 ppbv in VW-51-D.
- Trichlorofluoromethane = 900 ppbv in VW-46-S.
- 1,1,1-Trichloroethane = 17 ppbv in VW-58-I.

There are no SGPSs for VOC constituents in Non-Compliance Wells.

4. Based on the ambient air and QA/QC results, the benzene, toluene, PCE, trichlorofluoromethane, and 1,1,1,-trichloroethane concentrations do not appear to be associated with ambient air conditions or laboratory handling/testing procedures. Ambient air samples collected from compliance wells VW-35 and VW-42, from Non-Compliance Vapor Well VW-62, and from in-business ambient air locations IBM-24 (AMB) and IBM-49 (AMB) during the Third and Fourth Quarters of FY 2006-2007 indicated ambient levels of only up to 0.55 ppbv, 1.9 ppbv, <0.25 ppbv, 0.3 ppbv, and <0.31 ppbv for benzene, toluene, PCE, trichlorofluoromethane, and 1,1,1-trichloroethane, respectively. Duplicate samples were also collected and analyzed in five non-compliance wells in the Third and Fourth Quarters of FY 2006-2007 and indicated comparable results with a few exceptions (e.g., PCE being detected at <0.21 ppbv and 2.4 ppbv in VW-61-D, m&p xylenes being detected at 0.58 ppbv and 2.4 ppbv in VW-61-D, carbon disulfide being detected at 7.1 ppbv and 20 ppbv in VW-61-D). Also, QA/QC results from Summa canister certifications and trip/field blanks analyzed during the Third and Fourth Quarters of FY 2006-2007 were non-detect for benzene and other VOCs.

5. While some benzene concentrations increased in Non-Compliance Vapor Wells, other concentrations stayed at similar levels or decreased. These conditions will be monitored closely in subsequent monitoring events. As discussed previously, the above conditions may be due to a change in organic decomposition processes (i.e., an increase in aerobic and

decrease in anaerobic decomposition). Since aerobic decomposition occurs at a higher rate than anaerobic decomposition, a change/increase in soil gas migration may be occurring. This change may be moving soil gas including benzene from areas containing waste to non-waste containing areas (e.g., Compliance Vapor Well locations).

6. The fixed gas results along with those for methane indicate that the primary biodegradation mechanism near the Non-Compliance Vapor Wells is likely aerobic due to the elevated carbon dioxide and nitrogen levels, reduced oxygen levels and significant declines in some methane levels. Also, several wells exhibited trends of decreasing oxygen and increasing carbon dioxide levels after remedy implementation, further supporting a transition to aerobic conditions. There are cases where oxygen is increasing and carbon dioxide is decreasing (VW-55-D, VW-56-I, VW-56-D, VW-61-S, VW-62-D) but methane is still at low levels. These cases may be indicative of one or more of the following conditions:
   - Petroleum hydrocarbons are being depleted in this zone and less aerobic degradation is occurring.
   - Vapor containing larger amounts of oxygen and less carbon dioxide are migrating into this zone from other locations in which less aerobic degradation is occurring.
   - Greater amounts of air are infiltrating this zone and impacting the composition of the vapor.

7. Although data for nitrogen, oxygen, carbon monoxide and carbon dioxide were not collected prior to remedy implementation, the fixed gases and methane indicate a more aerobic condition after implementation. This suggests the remedy may be supporting an increase in oxygen flow into the soil as a result of operation of the Reservoir Gas Collection System and biovent wells. Note that aerobic decomposition is a more rapid degradation process than anaerobic degradation. Thus, more gas generation/migration may be occurring now than prior to remedy implementation.

8. The frequency of monitoring Non-Compliance Vapor Wells is based on the Decision Matrix Criteria for Soil Gas Monitoring Data shown in Figure 4-2. With EPA approval, it has been determined that the monitoring frequency will be switched from quarterly to semi-annually (First and Third Quarters) beginning in the First Quarter of FY 2007-2008.

8.3.1.3 Statistical Analysis of Soil Gas Results at Non-Compliance Vapor Wells

1. Section 4.6 provides a detailed discussion of the purpose and approach to statistical analysis of the Non-Compliance Vapor Wells. The primary purpose of statistical analysis is to identify statistically significant concentration changes of the 18 soil gas performance standard compounds. Statistically significant changes can be an indicator of important changes occurring in the soil gas following remedy implementation. The statistical analysis of the data was performed using the computer program DUMPStat.

2. The statistical analysis indicates CUSUM control limit exceedences at 15 out of 25 Non-Compliance Vapor Wells during the time period of October 1, 2006 through September 30, 2007. Statistically significant exceedances are summarized in Table 5-5. The results indicate reduced CUSUM control limit exceedances following the second quarter, i.e., there were 6, 14, 7, and 5 CUSUM Limit exceedances in the First, Second, Third and Fourth quarters, respectively.

3. During the time period of October 1, 2006 through September 30, 2007, benzene exceeded the CUSUM limit in 9 of the 25 wells. Methane exceeded the limit in 4 of the 25 wells. Toluene (3), PCE (2), m-+p-xylene (1), and 1,1,1-trichloroethane (1) exceeded the limit in the indicated number of wells.

4. There was one significant upward trend and one significant downward trend during the reporting period.

5. The soil gas conditions resulting in CUSUM Limit exceedances may be associated with an overall change in the soil gas generation/decomposition process that is resulting in increased gas migration and associated variations in constituent concentrations. Section 5.3.3 discusses the possibility that the soil gas generation process may be transitioning from the slow anaerobic decomposition process that was present prior to remedy implementation to the more rapid aerobic decomposition process after remedy implementation. This decomposition process change may be due to increases in oxygen to the subsurface from operation of the Reservoir Gas Collection System and the biovent wells. This transition in the degradation process may be causing a change in soil gas migration and soil gas constituent concentrations.

6. In December 2007 the reservoir gas collection system was converted to a passive mode of operation (i.e., no vacuum is being applied). This change reduces air being drawn into the subsurface soil. The benefits of reducing air infiltration into the subsurface soil will be evaluated. If soil gas constituent concentration changes continue to be statistically significant (i.e., CUSUM limit exceedances), indicate increasing decomposition process changes from anaerobic to aerobic, and/or indicate unacceptable migration of soil gas, it may be prudent to disconnect or reverse the one-way valves of the biovent wells for a period of time. During this time, the soil gas would be monitored for beneficial changes in regard to constituent concentrations, migration and decomposition processes.

8.4 SURFACE EMISSIONS AND OUTDOOR MONITORING

1. The system performance requirements for the two ambient air monitoring locations (IBM-24[AMB] and IBM-49[AMB]) are summarized in Table 3-1. Historical data from previous ambient air monitoring events along with the results from the first six months of OM&M activities are presented in Chapters 4.0 and 5.0.

2. The results presented in Chapter 5.0 and Table 5-2 indicates that the constituents analyzed were below the IATLs (e.g., methane and VOCs). The methane results were low for each ambient air location (e.g., 1.9 to 2.2 ppmv) and the TGNMO levels were non-detect. The specific priority pollutant VOCs were either non-detect, in the low ppbv range, an/or below the IATLs for each location (e.g., at IBM-49[AMB] benzene =0.55 ppbv, toluene = 1.8 ppbv, m&p xylenes = 1.1 ppbv, and o-xylene = 0.39 ppbv). The levels of TCE detected in one of the two sampling rounds performed during the Compliance Testing period, and which were determined to be the result of ambient air contaminant conditions or laboratory contamination, were not reported during this monitoring period.

3. Based on these results and the Decision Matrix for In-Business and Ambient Air Monitoring shown in Figure 4-1, the monitoring frequency is recommended to be reduced to semi-annual but will continue to be quarterly pending EPA approval.

8.5 GROUND WATER MONITORING SYSTEM

8.5.1 BASELINE GROUND WATER CONCENTRATIONS

1. The system performance requirements for ground water monitoring are summarized in Table 3-1 and the activities and results from the Third and Fourth Quarters of FY 2006-2007 are presented in Chapters 3.0, 4.0 and 5.0. The results indicate that remaining WDI waste contaminants are not migrating into the ground water.

2. The results of the ground water COC analyses and for the current reporting period are included in Table 5-6 along with historical results. The results above MCLs in Table 5-6 are highlighted. Manganese was detected above the MCL in two Near-Source Detection Wells and one Verification Well in this reporting period and has been detected above the MCL in Background, POC, Near-Source Detection and Verification Wells in prior monitoring events, indicating a regional ground water condition. Although not detected during this reporting period, arsenic has been detected above and/or below the MCL in Background, POC, Near-Source Detection and Verification Wells in prior monitoring events, also indicating a regional ground water condition.

3. Benzene, toluene, and xylenes along with ethylbenzene, which is not a ground water COC, were detected at elevated concentrations in POC Wells GW-22 and GW-23 in June 2007. Since these constituents had not been detected in the Site ground water wells previously, confirmation sampling was performed on these two wells in August 2007. Benzene, toluene, ethylbenzene and xylenes were not detected in the confirmation sampling results, indicating the initial June 2007 results were likely laboratory contamination and/or sampling error.

4. Other VOCs were not detected in the wells with the exception of TCE being detected below its MCL (5 μg/L) in GW-22 (2 μg/L) during confirmation sampling in August 2007 and acetone being detected in GW-12 (12 μg/L). TCE and/or PCE have been detected in Background Wells GW-10 and GW-11, and in POC Well GW-22 in prior monitoring events, indicating likely upgradient sources. Acetone is not a ground water COC and is known to be a common laboratory contaminant.

5. The frequency of monitoring for ground water is based on the Decision Matrix Criteria for Ground Water Monitoring shown in Figure 4-3. Based on the analytical results during this first year of OM&M, the monitoring frequency will decrease from semi-annual to annual starting in the First Quarter of FY 2007-2008 (December 2007).

8.5.2 STATISTICAL ANALYSIS OF GROUND WATER RESULTS

1. Sections 4.6 and 5.4.2.6 discuss the approach to and results of statistical analysis of analytical data, respectively. The results indicate the ground water data to be in control, i.e., only two exceedances of a prediction limit occurred. The two prediction limit exceedances occurred for manganese at wells GW-22 and GW-29. Manganese is a naturally occurring constituent in the regional ground water below the site.

8.6 STORMWATER MONITORING SYSTEM

1. The performance requirements for stormwater are summarized in Table 3-1 and the activities and results from the Third Quarter and Fourth Quarters of FY 2006-2007 are presented in Chapters 3.0, 4.0 and 5.0.

2. Stormwater sampling was not conducted during this monitoring period due to low rainfall events (e.g., less than 2 inches of rainfall in 24 hours). Routine inspections of monitoring points and stormwater drainage control systems were conducted during this reporting period and the results are presented in Chapter 3.0.

8.7 QUALITY ASSURANCE/QUALITY CONTROL

8.7.1 TRIP/FIELD BLANK AND BACKGROUND ANALYSIS RESULTS

1. The soil gas, in-business air, ambient air and ground water monitoring included Summa canister certifications (soil gas and air samples) and the analysis of trip/field blanks (soil gas and ground water), equipment rinsate blanks (ground water), duplicates (soil gas, air, and ground water) and collection and analysis of background ambient air samples during the Third and Fourth Quarters monitoring and sampling activities. The results for these samples are presented in Chapters 5.0 and 6.0. The results indicated that Summa canister cleaning and handling procedures along with vapor and ground water sampling, collection and handling procedures did not result in contaminant introduction.

2. Duplicate samples provided comparable results with only moderate variability for a few constituents. Ambient air background samples confirmed the presence of only low levels of some VOCs below IATLs and SGPSs. As noted previously, one ambient air sample collected during in-business air monitoring contained benzene at levels which may have contributed to the measured in-business concentration slightly above the IATL in one

location. The ambient air samples collected during vapor well monitoring did not contain VOCs at levels that had a material impact on the vapor well sample results above SGPSs.

8.7.2 DATA VALIDATION

1. Pursuant to the QAPP, ten percent of the soil gas, in-business air, and ambient air Level III data and ground water Level II data from the Third and Fourth Quarters monitoring events were validated. The validation results are presented in Chapter 6.0 and show that the analyses conducted during the OM&M reporting period are useable. The data quality for the organic analyses was good and indicates that the data met general QA/QC requirements for critical elements.

2. A few organic results for the validated vapor samples required qualification due to holding times, increased/decreased instrument sensitivities in continuing calibration standards and matrix interferences. The qualifiers are associated with only a few constituents (i.e., acetone, vinyl acetate, styrene, carbon disulfide) and do not have a material effect on the monitoring results or conclusions herein.

3. The analytical results for the three ground water samples that were validated did not require qualification.

8.8 RECOMMENDATIONS

1. The Reservoir Gas Collection System was switched to passive mode in December 2007 due to low emissions rates for methane (< 2.3 pounds per day), TGNMO (< 20 ppmv as hexane), and VOCs (< 1.0 pound per day) after one year of operation. It is recommended that the Reservoir Gas Collection System remain in the passive mode and monitored semi-annually pursuant to the OMMP. Operation of the system in passive mode will provide an opportunity to evaluate changes to soil gas quality as a result of decreased air infiltration.

2. The four constituents (i.e., benzene, toluene, TCE and PCE) detected above the IATLs in five In-Business locations are believed to be associated with tenant activities. It is recommended that In-Business and Ambient Air monitoring and sampling frequency be reduced to semi-annual in accordance with the Decision Criteria Figure 4-1, but will continue on a quarterly basis pending EPA approval. The results of samples collected from four additional in-business locations (i.e., IBM-12, IBM-42, IBM-43 and IBM-44) due to

statistically significant concentration increases in non-compliance vapor wells VW-49, VW-58 and VW-61, did not exceed the IATLs and, therefore, these locations will not be sampled again unless required by the decision matrices.

3. Due to continued elevated recovery rates, automatic leachate recovery systems were installed on Leachate Wells LC-2 and LC-4 and started up in December 2007. It is recommended that the automatic recovery systems remain in operation until leachate recovery data indicate declines to levels of 36 inches or less per week for these wells or the rate of liquid recovery is demonstrated to be low (e.g., 10 gallons per day or less). It is also recommended that manual, weekly bailing of wells LC-1 and LC-3 continue pursuant to the OMMP.

4. The soil gas monitoring results indicate that gas migration from the remaining wastes at the WDI Site is not occurring and/or is not significant. Therefore, after completing the first year of monitoring and with EPA approval, the monitoring and sampling frequency of soil gas for Compliance and Non-Compliance Vapor Wells was switched from quarterly to semi-annually (First and Third Quarters) starting in the First Quarter of FY 2007-2008 (December 2007). It is recommended that semi-annual monitoring continue with future frequency changes as directed by the *Decision Matrix Criteria for Soil Gas Monitoring Data*.

5. Subsurface biodegradation changes appear to be occurring due to the operation of the Reservoir Gas Collection System and Biovent Wells that have introduced air below ground. The monitoring results indicate the subsurface has become more aerobic and may be supporting some vapor phase contaminant migration. In order to minimize these changes and reduce the potential migration, it is recommended that the Biovent Wells be closed or reversed. As noted previously, the Reservoir Gas Collection System has already been converted to passive mode and the closing or reversing of the biovent wells will further reduce air infiltration to the subsurface.

6. Based on the ground water results from the first year of O&M that indicate the presence of some metals due to regional conditions and TCE from a likely upgradient source, the monitoring and sampling frequency of ground water was switched from semi-annual to annual (First Quarter) starting in the First Quarter of FY 2007-2008 (December 2007). It is recommended that annual monitoring continue with future frequency changes as directed by the *Decision Matrix Criteria For Ground Water Monitoring*.

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